C
N81S2e
1921/22

Northeastern College

January 1921

CATALOG

of the

SCHOOL OF ENGINEERING

1921-1922

NORTHEASTERN COLLEGE

Boston Young Men's Christian Association

Number 316 Huntington Ave., Boston, Massachusetts

Digitized by the Internet Archive
in 2013

http://archive.org/details/catalogofschoolo1921nort

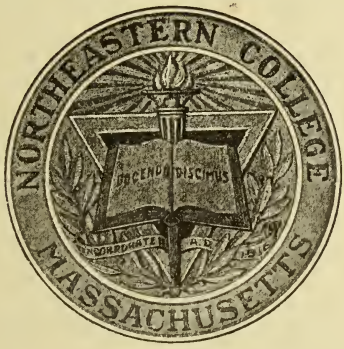
THE ASSOCIATION BUILDING
HOME OF NORTHEASTERN COLLEGE

Northeastern College

CATALOG

of the

School of Engineering



1921-1922

Co-operative Plan

NORTHEASTERN COLLEGE

Boston Young Men's Christian Association

YEARLY CALENDAR

1921

JANUARY

S	M	T	W	T	F	S
.	.	.	.	.	.	*1*
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	.	.	.	.	.

FEBRUARY

S	M	T	W	T	F	S
.	.	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	*21*	*22*	23	24	25	26
27	28	.	.	.	.	.
.	.	.	.	.	.	.

MARCH

S	M	T	W	T	F	S
.	.	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	.	.
.	.	.	.	.	.	.

APRIL

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	*18*	*19*	20	21	22	23
24	25	26	27	28	29	30
.	.	.	.	.	.	.

MAY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	*28*
29	*30*	*31*	.	.	.	.
.	.	.	.	.	.	.

JUNE

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	*17*	*18*
19	20	21	22	23	24	*25*
26	27	28	29	30	.	.
.	.	.	.	.	.	.

JULY

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	4	5	6	7	8	9
10	*11*	*12*	*13*	*14*	*15*	*16*
17	*18*	*19*	*20*	*21*	*22*	*23*
24	*25*	*26*	*27*	*28*	*29*	*30*
31	.	.	.	.	.	.

AUGUST

S	M	T	W	T	F	S
.	*1*	*2*	*3*	*4*	*5*	*6*
7	*8*	*9*	*10*	*11*	*12*	*13*
14	*15*	*16*	*17*	*18*	*19*	*20*
21	22	23	24	25	26	27
28	29	30	31	.	.	.
.	.	.	.	.	.	.

SEPTEMBER

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	*4*	*5*	*6*	*7*	*8*	*9*
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
.	.	.	.	.	.	.

OCTOBER

S	M	T	W	T	F	S
.	.	.	.	.	.	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	.	.	.	.	.

NOVEMBER

S	M	T	W	T	F	S
.	.	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	.	.	.
.	.	.	.	.	.	.

DECEMBER

S	M	T	W	T	F	S
.	.	.	.	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	*22*	*23*	*24*
25	*26*	*27*	28	29	30	31
.	.	.	.	.	.	.

1922

JANUARY

S	M	T	W	T	F	S
1	*2*	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	.	.	.	.
.	.	.	.	.	.	.

FEBRUARY

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	*22*	23	24	25
26	27	28	.	.	.	.
.	.	.	.	.	.	.

MARCH

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	.
.	.	.	.	.	.	.

APRIL

S	M	T	W	T	F	S
.	.	.	.	.	.	1
2	3	4	5	*6*	*7*	*8*
9	10	11	12	13	14	15
16	*17*	*18*	*19*	20	21	22
23	24	25	26	27	28	29
30	.	.	.	.	.	.
.	.	.	.	.	.	.

MAY

S	M	T	W	T	F	S
.	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	*29*	*30*	31	.	.	.
.	.	.	.	.	.	.

JUNE

S	M	T	W	T	F	S
.	.	.	.	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	*17*
18	19	20	21	22	23	*24*
25	26	27	28	29	30	.
.	.	.	.	.	.	.

JULY

S	M	T	W	T	F	S
.	.	.	.	.	.	*1*
2	3	4	5	6	7	*8*
9	*10*	*11*	*12*	*13*	*14*	*15*
16	*17*	*18*	*19*	*20*	*21*	*22*
23	*24*	*25*	*26*	*27*	*28*	*29*
30	*31*	.	.	.	.	.

AUGUST

S	M	T	W	T	F	S
.	.	*1*	*2*	*3*	*4*	*5*
6	*7*	*8*	*9*	*10*	*11*	*12*
13	*14*	*15*	*16*	*17*	*18*	*19*
20	21	22	23	24	25	*26*
27	28	29	30	31	.	.
.	.	.	.	.	.	.

SEPTEMBER

S	M	T	W	T	F	S
.	.	.	.	.	1	*2*
3	*4*	5	6	7	8	*9*
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
.	.	.	.	.	.	.

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	*12*	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	.	.	.	.
.	.	.	.	.	.	.

NOVEMBER

S	M	T	W	T	F	S
.	.	.	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	*30*	.	.
.	.	.	.	.	.	.

DECEMBER

S	M	T	W	T	F	S
.	.	.	.	.	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	*25*	26	27	28	29	30
31	.	.	.	.	.	.

School Periods for Division A indicated by type thus: 1 2 3.
School Periods for Division B indicated by type thus: 1 2 3.
Periods when School is not in session indicated by type thus: *1 2 3.*

CALENDAR 1921-1922

January 1, Saturday
New Year's Day (School exercises omitted)

January 31, Monday
Third Period (Spring Term) begins for Division A

February 21, Monday
School exercises omitted

February 22, Tuesday
Washington's Birthday (School exercises omitted)

March 7, Monday
Third Period (Spring Term) begins for Division B

April 11, Monday
Fourth Period begins for Division A

April 18, Monday
School exercises omitted

April 19, Tuesday
Patriot's Day (School exercises omitted)

May 16, Monday
Fourth Period begins for Division B

May 28, Saturday
School exercises omitted

May 30, Monday
Memorial Day (School exercises omitted)

May 31, Tuesday
School exercises omitted

June 12, Sunday
Baccalaureate Sermon

June 15, Wednesday
Annual Commencement

June 16, Thursday
First Entrance Examinations

June 17, Friday
Bunker Hill Day (School exercises omitted)

June 18, Saturday
School exercises omitted

Calendar, 1921-1922

General Notes

Division B is at Engineering Practice while Division A is at school.

Division A is at Engineering Practice while Division B is at school.

Periods at school are shown by different kinds of type on Yearly Calendar.

All Engineering practice Periods are of five weeks duration throughout the year.

Students while at Engineering Practice have no holidays except those regularly allowed by the employing firm.

Special Notes for 1921

June 20-July 23 Division B at Engineering Practice.

August 8-Sept. 10 Division A at Engineering Practice.

July 11-August 6 Summer Vacation for Division A.

July 25-August 20 Summer Vacation for Division B.

July 25-August 6 Neither division at Engineering Practice or at school

June 20, Monday
Summer Term begins for Division A

July 4, Monday
Independence Day (School exercises omitted)

August 22, Monday
Summer Term begins for Division B

September 5, Monday
Labor Day (School exercises omitted)

September 8, Thursday
Second Entrance Examinations

September 12, Monday
First Period (Fall Term) begins for Division A

October 12, Wednesday
Columbus Day (School exercises omitted)

October 17, Monday
First Period (Fall Term) begins for Division B

November 21, Monday
Second Period begins for Division A

Calendar, 1921-1922

November 24, Thursday
Thanksgiving Day (School exercises omitted)

December 22-17 inc.
Christmas Recess

December 28, Wednesday
Second Period begins for Division B

January 2, Monday
Observance of New Year's Day (School exercises omitted)

January 30, Monday
Third Period (Spring Term) begins for Division A

February 22, Wednesday
Washington's Birthday (School exercises omitted)

March 6, Monday
Third Period (Spring Term) begins for Division B

April 6-7-8, Thursday, Friday, Saturday
School exercises omitted

April 10, Monday
Fourth Period begins for Division A

April 17-18, Monday, Tuesday
School exercises omitted

April 19, Wednesday
Patriot's Day (School exercises omitted)

May 15, Monday
Fourth Period begins for Division B

May 29, Monday
School exercises omitted

May 30, Tuesday
Memorial Day (School exercises omitted)

June 14, Wednesday
Annual Commencement

June 15, Thursday
First Entrance Examinations

June 17, Saturday
Bunker Hill Day (School exercises omitted)

Calendar, 1921-1922

General Notes

(See page 4)

Special Notes for 1922

June 19-July 22 Division B at Engineering Practice.

August 7-September 9 Division A at Engineering Practice.

July 10-August 5 Summer Vacation for Division A.

July 24-August 19 Summer Vacation for Division B.

July 24-August 5 Neither division at Engineering Practice or at school.

June 19, Monday
Summer Term begins for Division A

July 4, Tuesday
Independence Day (School exercises omitted)

August 21, Monday
Summer Term begins for Division B

September 4, Monday
Labor Day (School exercises omitted)

September 7, Thursday
Second Entrance Examinations

September 11, Monday
First Period (Fall Term) begins for Division A

October 12, Thursday
Columbus Day (School exercises omitted)

October 16, Monday
First Period (Fall Term) begins for Division B

November 20, Monday
Second Period begins for Division A

November 30, Thursday
Thanksgiving Day (School exercises omitted)

December 25, Monday
Christmas Day (School exercises omitted)

December 26, Tuesday
Second Term begins for Division B

Northeastern College

The Trustees

PRESIDENT

ARTHUR STODDARD JOHNSON

1ST VICE-PRESIDENT

ALBERT HARMON CURTIS

2ND VICE-PRESIDENT

SABIN POND SANGER

3RD VICE-PRESIDENT

WILMAN EDWARD ADAMS

SECRETARY

GALEN DAVID LIGHT

TREASURER

LEWIS ABBOTT CROSSETT

WILLIAM CONVERSE CHICK
RUSSELL STURGIS CODMAN
HENRY BRADLEY FENNO
GEORGE CABOT LEE
HENRY GARDNER LORD
FRANCIS POPE LUCE
WILLIAM EVERETT MACURDA
JOSEPH GRAFTON MINOT
WALTER BEMIS MOSSMAN
HENRY WHITING NEWHALL
SILAS PIERCE
ARTHUR PERRY, JR.
THOMAS HASTING RUSSELL
SABIN POND SANGER
FRANK PALMER SPEARE
STANWOOD GRAY WELLINGTON

Board of Governors

CHAIRMAN

ALBERT HARMON CURTIS

WILMAN EDWARD ADAMS
WILLIAM CONVERSE CHICK
STANWOOD GRAY WELLINGTON
ARTHUR STODDARD JOHNSON
WILLIAM EVERETT MACURDA
FRANK PALMER SPEARE

Northeastern College

OFFICERS OF THE COLLEGE

FRANK PALMER SPEARE, M.H., *President*

GALEN DAVID LIGHT, A.B., *Secretary*

THE EXECUTIVE COUNCIL

FRANK PALMER SPEARE, M.H.
President of the College

GALEN DAVID LIGHT, A.B.
Secretary of the College

CARL STEPHENS ELL, A.B., M.S.
Dean of the School of Engineering and the Evening Polytechnic School
Regional Director

DANA SCOTT SYLVESTER, L.L.B., B.C.S.
Dean of the School of Commerce and Finance

EVERETT AVERY CHURCHILL, A.B.
Dean of the School of Law

CARL DAVID SMITH, B.H.
Regional Director

IRA ARTHUR FLINNER, A.B., A.M.
Superintendent of Secondary Schools

Northeastern College

FACULTY OF THE SCHOOL

Carl Stephens Ell, A.B., M.S., Dean 52 Clement Ave., West Roxbury
Professor of Civil Engineering

Philip Curtis Nash, A.B., M.C.E. 5 Mansfield St., Allston
Director of Engineering Practice and Professor of Civil Engineering
In charge, Department of Civil Engineering

John Butler Pugsley, A.B., Registrar 23 Hardy Ave., Watertown
Assistant Professor of Mathematics

George Francis Ashley 163 Summer St., Somerville
Professor of Drawing
In charge, Department of Drawing

Joseph Arthur Coolidge, S.B. 20 Martin St., Cambridge
Professor of Phsyics
In charge, Department of Physics

Pearl Whitefield Durkee, B.S. 505 Huntington Ave., Boston
Professor of Electrical Measurements

William Lincoln Smith, S.B. 4 Academy Lane, Concord
Professor of Electrical Engineering
In charge, Department of Electrical Engineering

George Wright Swett, S.B. 11 Henry Ave., Melrose Highlands
Professor of Mechanical Engineering
In charge, Department of Mechanical Engineering

Robert Seaton Williams, Ph.D. 156 Magazine St., Cambridge
Professor of Analytical Chemistry
In charge, Department of Chemical Engineering

Henry Bissell Alvord, S.B. 32 Hollis St., South Weymouth
Assistant Professor of Civil Engineering

Percy Francis Benedict, S.B. 491 Belmont St., Belmont
Assistant Professor of Civil Engineering

George Blodgett Gee, C.E. 17 Pine St., Belmont
Assistant Professor of Drawing

Northeastern College

FACULTY OF THE SCHOOL
(Continued)

JOSEPH SPEAR, A.B. — 819 Salem St., Malden
Assistant Professor of Mathematics
In charge, Department of Mathematics

CHESTER PACKARD BAKER — 53 Wendell Ave., Brockton
Instructor in Chemistry

JESSE JENNINGS EAMES, S.B. — Swampscott, Mass.
Instructor in Mechanical Engineering

ALFRED JOHN FERRETTI, S.B. — 92 Church St., Lynn
Instructor in Mechanical Engineering

LEON FREDERICK GIRARD — 206 Massachusetts Ave., Boston
Instructor in Physics

HAROLD WESLEY MELVIN, B.A. — 21 Austin St., Milton
Instructor in English
In charge, Department of English

LEON WOODMAN PARSONS, Ph.D. — 5 Braemore Road, Brookline
Instructor in Physical Chemistry

ROLAND GUYER PORTER — 39 Baker Ave., Beverly
Instructor in Electrical Engineering

ARTHUR HITCHCOCK RADASCH, S.B. — 1200 Massachusetts Ave., Cambridge
Instructor in Chemical Engineering

JOHN STANLEY RAFFETY, B.A. — 73 Mountfort St., Boston
Instructor in Civil Engineering

JOHN JAMES SINNETT — 24 Bardwell St., Jamaica Plain
Instructor in Physical Training

ARTHUR EARLE SMITHIES — Room 620, Boston Y. M. C. A.
Instructor in Physics

FREDERICK A. STEARNS, S.B. — 208 Grove St., Melrose
Instructor in Mechanical Engineering

SAMUEL ABBOTT SMITH STRAHAN — 26 Hemenway St., Boston
Instructor in Chemical Engineering

Northeastern College

FACULTY OF THE SCHOOL
(Continued)

ASSISTANTS

Charles Reid Allan *Assistant in Physics*	37 Hawthorne Road, Pittsfield
Abraham Albert Becker *Assistant in Chemistry*	298 Western Ave., Cambridge
Theodore Benjamin Bliss *Assistant in Chemistry*	75 Prince St., Jamaica Plain
Alfred Brown *Assistant in Chemistry*	18 Green St., Everett
Ralph Eugene Brown *Assistant in Physics*	475 Union St., Rockland
Edward S. Parsons *Assistant in Civil Engineering*	705 Washington St., Gloucester
Charles Clifton Russell, Jr. *Assistant in Electrical Engineering*	21 Eliot St., Quincy
Jesse Arnold Shaw *Assistant in Chemistry*	14 Page St., Danvers
Benjamin Lincoln Smith *Assistant in Electrical Engineering*	4 Academy Lane, Concord
Roger Eliot Spear *Assistant in Civil Engineering*	90 Gainsborough St., Boston

Northeastern College

SPECIAL LECTURERS

ASA S. ALLEN
Member of the Law Firm of Curtin, Poole & Allen
"Law and Engineering"

MATTHEW C. BRUSH
President, American National Ship Building Corp.
"The Human Equation in Business"

JOE MITCHELL CHAPPLE
Editor of the "National Magazine"
"The Magic of Memories"

HIS EXCELLENCY CHANNING H. COX
Governor of the Commonwealth of Massachusetts
"Civic Responsibilities"

BREWER EDDY
Assoc. Secretary, American Board of Commissioners for Foreign Missions
"America's International Duty"

CHARLES W. ELIOT
President Emeritus of Harvard University
"A Useful and Enjoyable Life"

EDWIN H. HUGHES
Bishop, Methodist Episcopal Church, Boston Area
"Money and Education"

PAYSON SMITH
State Commissioner of Education
"Productive Education"

FRANK P. SPEARE
President of Northeastern College
"College Men in Industry"

GEORGE F. SWAIN
Professor of Civil Engineering, Harvard University
"The Dangers of Idealism"

CURTIS H. WATERMAN
Lawyer
"What is a Profiteer?"

DeWITT G. WILCOX
Surgeon
"A Young Man's Problems"

GENERAL INFORMATION

Historical

In September, 1909, the Department of Education of the Boston Young Men's Christian Association began to offer co-operative engineering courses in connection with the Evening Polytechnic School. At that time, the co-operative course students were employed by engineering firms on the one week period plan, a student working one week while his alternate was going to school, and at the close of the week exchanging places so that the student who had been to school went to work. Conditions were such that the students attended both day and evening classes. Two years later it was decided to establish an engineering school, to do work of college grade, based entirely on the part-time, or co-operative plan. Thus, in 1909, was started what is now the School of Engineering of Northeastern College.

In the twelve years that have elapsed since the inception of the idea, the school, which was started with no special educational requirements for entering students, and which had but little equipment and a registration of only eight pupils, has grown to be a recognized factor in the community, with rigid requirements of scholarship and character for entering students, thousands of dollars' worth of equipment, a highly trained and able faculty, and an enrollment of five hundred and seventy-five students. It is enabling the young man of moderate financial ability to get a high-grade engineering training and at the same time not only defray his own expenses, but also become familiar with the actual practice of his profession.

In March, 1920, the school received the degree granting privilege through the Massachusetts Legislature.

Object of the School

Technical school instruction, depending on class-room work and laboratories, must always lack some of the vital characteristics of an actual manufacturing plant. One is carried on for educational purposes, while the other is operated for dividends. It is this latter fact that gives the co-operative school idea one great advantage over the usual educational plan. In-

stead of training the student for several years for a line of work to which he may later find himself entirely unfitted, the School at once puts the boy to work in a commercial plant. There he learns life in its vital issues, as well as the problem of getting along with men; thus early finding out whether he has made a wise or unwise choice of his life work. This training shows him the use and value of his school work, and finally gives him an unusual opportunity to acquire from actual experience that rare characteristic, *executive ability*, without which his life probably would be spent on the lower levels of industry.

The fundamental aim of this School is to give young men sound training in both the theoretical and practical principles upon which professional practice is based. Thus they are enabled to advance farther and more rapidly in their chosen work than they could expect to do without further education than that of a high-school course. The training is not in any sense that of a trade school, but is that of a regular engineering school of high standards.

There are four branches of engineering work offered: civil, mechanical, electrical, and chemical. The end sought is to give to students who have already had a high-school preparation, or its equivalent, a good training in the fundamental sciences of mathematics, chemistry and physics, and in the important applications of the principles of these sciences to the several branches of engineering. Much stress is laid on the development of the ability to apply the acquired knowledge to new engineering problems, and an effort is made to be thorough without leading the student through a maze of mere mental gymnastics.

The courses differ from those of many schools, in that a student is not permitted a wide range of subjects from which to choose. It has been found that better results are obtained by prescribing the principal studies which the student is to pursue.

Plan of Operation of the School

To illustrate the plan of operation of the School, take the case of two men, "A" and "B," who desire to take our Mechanical Engineering Course. "A" is assigned to one of the plants

of a firm that is co-operating with us. Here he is put to work, and spends five weeks working for the firm. Then "B," his alternate, who has spent the first five weeks in the School, takes "A's" place with the firm, and "A" puts in the next five weeks at school. Thus the work goes on, the two men exchanging places at the beginning of each five week period.

Relation of School to High Schools

This School is peculiarly adapted to the high school graduate with limited financial resources who still has the ambition and ability to get ahead if given the opportunity.

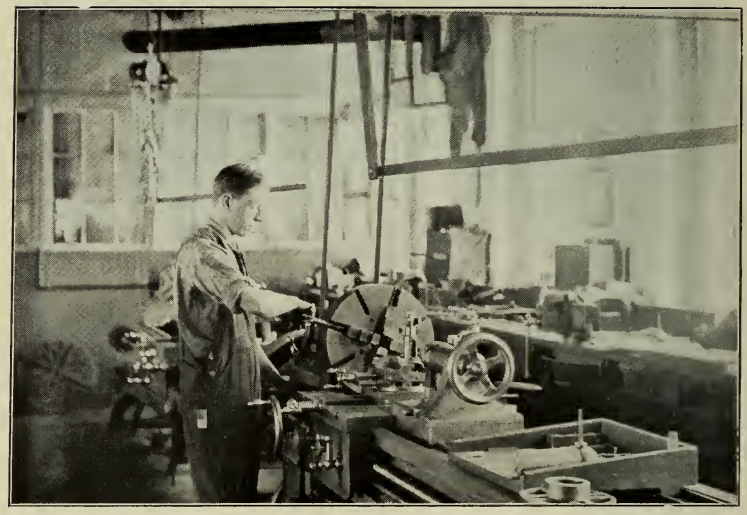
This year the school has a student body made up of graduates of the following schools:

Abington High School
Alton (N. H.) High School
Amesbury High School
Annapolis Royal Academy (Granville Ferry, Nova Scotia)
Anson (Me.) Academy
Arlington High School
Ashland High School
Athol High School
Attleboro High School
Avon High School
Baddeck High School (Sidney, Nova Scotia)
Bartlett High School (Webster)
Beezazian School (Constantinople, Turkey)
Bellows Falls High School
Belmont High School
Berkeley Preparatory School
Berlin (N. H.) High School
Beverly High School School
Boothbay Harbor (Me.) High
Boston College High School
Bourne High School
Braintree High School
Brewster Free Academy (Wolfeboro, N. H.)
Bridgeport (Conn.) High School
Bridgewater High School
Brighton High School
Bristol (Conn.) High School
Brockton High School
Brookfield High School
Brookline High School
Burlington (Vt.) High School
Cambridge Latin High School
Central High School (San Juan, Porto Rico)
Chelmsford High School
Chelsea High School
Chester High School
Chicopee High School
Clinton High School
Cohasset High School
High School of Commerce
Concord (Mass.) High School
Concord (N. H.) High School
Conway High School
Cony High School (Augusta, Me.)
Cranston (R. I.) High School
Dalton High School
Danvers High School
Dean Academy
Deep River (Conn.) High School
Deering (Me.) High School
Dexter (Me.) High School
Dorchester High School
Dummer Academy
Duxbury High School
East Boston High School
East Bridgewater High School
Eastport (Me.) High School
Enfield High School (Thompsonville, Conn.)
English High School
Essex County Agricultural School
Essex (Mass.) High School
Essex (Vt.) High School

Everett High School
Exeter (N. H.) High School
Fair Haven (Vt.) High School
Fairhaven (Mass.) High School
Fall River High School
Fitchburg High School
Foxboro High School
Framingham High School
Franklin High School
Freeport (Me.) High School
Fryeburg (Me.) Academy
Gardner High School
Georgetown High School
Gilman (Me.) High School
Gloucester High School
Gould's Academy (Bethel, Me.)
Groveland High School
Hallowell (Me.) High School
Hardwick (Vt.) Academy
Hartford (Conn.) High School
Haverhill Hill School
Hingham High School
Holbrook High School
Holliston High School
Holyoke High School
Hopedale High School
Horblitt Preparatory School
Huntington School
Hyde Park High School
Jonesport (Me.) High School
Keene (N. H.) High School
Kennebunk (Me.) High School
Kimball High School
Kingston High School
South Kingston (R. I.) High School
Lancaster High School
Lausitz High School (Germany)
Lee High School
Leicester High School
Lewis (Conn.) High School
Lewis & Clark High School (Washington)
Lexington High School
Livermore Falls (Me.) High School
Los Angeles (Cal.) High School
Lowell High School
Lyman Hall (Conn.) High School
Lynn Classical High School
Lynn English High School
Madison (Me.) High School
Maine Central Institute (Me.)
Malden High School
Manchester High School
Mansfield High School
Marblehead High School
Marlboro High School
Marshfield High School
Maynard High School
Mechanic Arts High School
Medford High School
Melrose High School
Middlebury (Vt.) High School
Milbridge (Me.) High School
Milford High School
Milton High School
Montpelier (Vt.) Seminary
Montpelier (Vt.) High School
Mt. Hermon School
Nantucket High School
Nashua (N. H.) High School
Natick High School
New Britain (Conn.) High School
Newburyport High School
Newton High School
North Attleboro High School
Northeastern Secondary School
Norton High School
Norwell High School
Norwood High School
Pawtucket High School
Peabody High School
Phillips Exeter Academy (N. H.)
Pittsfield High School
Plainfield (Conn.) High School
Plymouth High School
Portland (Me.) High School
Pratt (Conn.) High School
Proctor (Vt.) High School
Providence Technical High School
Provincetown High School
Putnam (Conn.) High School
Quincy High School
Reading High School
Revere High School
Richards (N. H.) High School
Rindge Technical High School
Rochester (N. H.) High School
Rochester (N. Y.) High School
Rockland High School
Sacred Heart High School (R. I.)
Salem High School
Sanderson Academy
Schuylerville (N. Y.) High School
Scituate High School
Sharon High School
Shrewsbury High School
Simsbury (Conn.) High School

THE LOBBY

Mechanical Engineering Students



Machine Shop Work
Dennison Manufacturing Company—Framingham

Class in Drafting
Drafting Rooms

Skowhegan (Me.) High School
Solon (Me.) High School
Somerville High School
Springfield Technical High
Stephens (Me.) High School
Stevens (N. H.) High School
Stoneham High School
Stonington (Conn.) High School
Stoughton High School
Stowe High School
Sudbury High School
Swampscott High School
Taunton High School
Templeton High School
Thayer Academy
Thompson High School (Conn.)
Tilton (N. H.) Seminary
Traip (Me.) Academy
Vinalhaven (Me.) High School
Wakefield High School
Waltham High School
Watertown High School
Wellesley High School
West Roxbury High School
West Springfield High School
Westbrook (Me.) Seminary
Westinghouse High School
Weymouth High School
Williamstown High School
Williston Seminary
Wilmington High School
Windham (Conn.) High School
Winthrop High School
Woburn High School
Woodstock (Conn.) Academy
Woodstock (Vt.) High School
Woodsville (N. H.) High School
Worcester Classical High
Worcester Commercial High
Worcester South High School
Worcester Trade School

ENGINEERING EQUIPMENT

The School is housed in the buildings of the Association, and in addition occupies the entire third floor of the Gainsborough Building, directly opposite.

The equipment available for the use of the School includes:

36 Class Rooms
5 Drawing Rooms
3 Chemical Laboratories
1 Electrical Engineering Laboratory
1 Electrical Measurements Laboratory
1 Mechanical Engineering Laboratory
2 Physics Laboratories
Civil Engineering Equipment
2 Libraries
3 Social Rooms
3 Game Rooms
3 Gymnasiums
1 Swimming Pool
2 Large Halls
8 Offices and Equipment

Mechanical Laboratories

The steam power plant is completely equipped with meters, scales, indicators, Orsat apparatus for flue gas analysis, and all other equipment necessary for making complete power plant tests. The plant consists of four horizontal-return tubular boilers, two of which are equipped for burning fuel oil and two for burning coal; and four three wire generators, of which, three are driven by Ridgway reciprocating steam engines of various sizes, and the other is direct connected to a Westinghouse-Parsons turbine. This places at the disposal of our classes a perfectly equipped, up-to-date, engineering laboratory, and gives them the means of carrying on boiler tests, determining the efficiencies of various fuels and oils, taking indicator diagrams, determining the efficiency of modern reciprocating engines and turbines when direct connected to generators, as well as renders them familiar with all the various auxiliary appliances of such a plant, as separators, pumps, air compressors.

The students also have the use of the equipment of our Automobile School, thus having opportunity to study the most advanced ideas in gasoline engine practice.

Field Instruments of Civil Engineering

For work in the field, the Civil Engineering Department possesses various surveying instruments, representing the principal makes and types in general use. The equipment includes

two Keuffel & Esser transits, two Buff & Buff transits, two Berger levels, two other levels, and three plane table outfits. There are Locke hand levels, flag poles, leveling rods, stadia rods, engineers' and surveyors' chains, steel and cloth tapes, and all the miscellaneous equipment necessary to outfit the parties that the instruments will accommodate. The transits are equipped with neutral glasses and reflectors for astronomical observations. For higher surveying there is an aneroid barometer for barometric leveling, a sextant for hydrographic surveying, and a Gurley Electric Current meter for hydraulic measurements.

The extent of the equipment and scope of the field work itself are designed to train the student's judgment as to the relative merits of the various types of field instruments.

Design and Drafting Rooms

The School possesses large, light, and well-equipped drawing rooms for the carrying on of the designing and drafting which form so important a part of engineering work. These rooms are supplied with lockers containing the drawing supplies, and files containing blue prints and photographs of machines and structures that represent the best practice.

Electrical Measurements Laboratory

The laboratory was entirely rebuilt during the summer of 1920. It is equipped with apparatus fundamentally planned for teaching the principles of measurement, rather than for the precise determination of quantitative results. Nevertheless it is necessary for the proper performance of work in the other laboratory courses that a certain amount of careful quantitative work should be done, and the equipment is being steadily increased and developed with both ends held in view.

A partial list of the apparatus available for instruction is the following. Under the first head, resistance by Ohm's law, substitution and direct reflection, voltmeter methods for high resistance, insulation resistance, specific resistance, slide wire bridge, electrostatic capacity, inductance, Poggendorf's method of E. M. F. comparison. Under the second head, a Laboratory

standard Wheatstone bridge, a Kelvin low resistance bridge, a Leeds Northrup potentiometer with two standard Weston cells, volt box and steady source of high voltage for voltmeter calibration, a commutator and leads for use with the Carey-Foster method, and a chemical balance.

The instrument room is supplied with 18 high grade G. E. and Weston ammeters and voltmeters of various sizes for D. C. work, together with numerous similar instruments of cheaper quality for lower class work.

For A. C. testing, there are 27 voltmeters and ammeters of various sizes arranged in groups of three for polyphase work, and 8 single or three phase wattmeters.

There is also a considerable amount of auxiliary apparatus such as frequency indicators, synchroscopes, and power factor meters.

Electrical Engineering Laboratory

The Laboratory was entirely remodeled during the summer of 1920. It is equipped with numerous machines of different types, the size and voltage ratings being selected to reduce as much as possible the risk from large voltage and power apparatus, while at the same time making available to the student commercial apparatus such that the various quantities it is desired to measure will be of reasonable dimensions.

Moderate-sized machines are used principally for this reason but also because the students in their Engineering Practice come into contact with the large-sized and varied machinery of modern power houses and electrical plants generally.

Among the machines of this department are a pair of matched Holtzer-Cabot 5 kv-a synchronous converters, specially planned to operate as 3 phase generators, motors or double current generators. They are driven independently by 10 HP 220 volt General Electric interpole motors, and may also be mechanically coupled for certain work.

There is also a pair of matched and specially designed direct current generators of 6 kilowatt rating at 220 volts, which may be operated either shunt or compound, driven by a 15 kilowatt interpole Sprague motor with double extended shaft. These machines are particularly intended for work on charac-

teristics and parallel operation, but may also be coupled so as to be available in the various "pumping back" methods of testing.

Alternating current is supplied by a three phase General Electric 15 kv-a alternator, giving practically a pure sine wave, driven by a 20 kw Westinghouse motor; there is also a 7.5 kv-a General Electric alternator driven from a 15 HP Sprague motor, fitted with taps from each armature coil, a 5 kv-a Holtzer-Cabot machine with two spare rotors making it available either as a generator, synchronous motor, squirrel cage or phase wound induction motor; and a dozen or so more motors and generators of various sizes and types.

There are two sets of G. E. type H transformers, three to the set, of 3 kv-a rating with primary voltage of 550 and secondary of 220-110, which may be used for transmission experiments as well as ordinary testing, and a very considerable assortment of variable ratio transformers, reactances, condensers, and similar control and testing apparatus aside from the very complete line of instruments belonging to the Electrical Measurements Laboratory.

Physics Laboratories

The Physics department has been completely equipped with all necessary apparatus for the experimental work that is required of the students, as well as that required for lecture demonstration. There are two large laboratories together with a lecture room devoted to Physics. The apparatus and equipment includes verniers, levels, a vacuum pump, planimeters, spherometers, calorimeters, thermometers, a pyrometer, a sonometer, a spectroscope, a spectrometer, balances, standard gram weight, lecture table galvanometer, optical disk with all accessories, lenses, photometer, an air thermometer, a full set of Weather Bureau apparatus, including a barograph, thermograph, hygrometer, barometer, maximum and minimum thermometers, etc. These give a wide range to the experimental work that can be done.

Chemical Laboratories

The School has three laboratories completely equipped in all respects for carrying on all lines of chemical work, from

that of a high school to that of most advanced college grade. They have accommodations for over one hundred and fifty students, and are suitably furnished with all the necessary appliances for chemical work. Some of these are: hoods, drying closets, a still, steam and hot water baths, electrolytic circuits, vacuum and pressure apparatus, balances, combustion furnaces, and complete sets of apparatus for the sampling and analysis of flue gases and fuels. There are also testing machines for oils, viscosimeters, and different sorts of flash point apparatus. A chemical museum is connected with this department where are kept specimens for purposes of illustration.

Libraries

The School shares the privileges of the steadily growing Libraries in the Main Building, to which have been added more than a $1000 worth of engineering texts purchased for the School. In addition to this, it subscribes to current periodicals on engineering and scientific subjects for the exclusive use of students. All members of the School are entitled to take books from the Boston Public Library, and this offers a very unusual opportunity to our non-resident students.

Department of Physical Training

Northeastern is one of the few colleges having facilities for all-round physical training. The gymnasium with its 12-laps running track, three basketball courts, wrestling, boxing, fencing and special exercise rooms, handball courts and bowling alleys, is one of the most complete in New England. The natatorium is one of the best in the country. It is in a separate building, having a glass roof, admitting abundant sunlight and has a continuous supply of filtered salt water. The tank is 75 feet long and 25 feet wide. Adjoining the building is a large field equipped for athletics. Here are four tennis courts, outdoor gymnasium, basketball court, jumping pits and a track with a 100-yd. straightaway; baseball and football fields. Interclass contests are arranged in basketball, baseball, tennis, indoor and outdoor athletics, and swimming. Intercollegiate games and meets are arranged with the leading colleges in the east.

ENGINEERING PRACTICE

Correlation of Practical and Theoretical Work

The employers who co-operate with us agree, where practicable, to employ the students in all the different departments of their establishments during their periods of engineering practice. This training is just as complete as the school work, and is just as thorough. Where possible, the course of the student is from the handling of the raw material to the shipment of the finished product. This practical training includes the use of the machines, as well as the executive duties of the plant, so that at the end of his course the graduate may not only know how to do things, but also why they are done in certain ways. Detailed reports are made by each student for each of his five week working periods. The subjects for these reports are chosen by the student and may be anything of importance in connection with his job. These reports are criticized and discussed when the student returns to school. Accurate records and grades are kept of the engineering practice of each student, and it is not possible to secure a degree unless this part of the course is completed successfully.

Number of Positions Available

The number of positions at our disposal in any one branch of engineering is necessarily limited. Thus far we have secured desirable positions for our students as the growth of the School has demanded. Nevertheless, to be at all sure of work in his chosen branch of engineering, an applicant should file his application early.

The applicants who apply for admission to the School too late to be assigned to practical work, may attend the School every period, or every alternate period, as they may wish, and will be assigned to practical work as soon as an opening occurs.

Sometimes, students may secure their own positions with firms, in which case an alternate can usually be furnished by the School, if desired. Such individual arrangements are entirely acceptable to the School, and may be made by any applicant, subject to the approval of the Director of Engineering Practice.

Attitude of Co-operating Firms

The favorable attitude of the co-operating concerns toward our plan is shown by their retention of the same students from year to year, even after graduation, and also in the fact that whenever vacancies occur which can be filled by our men, the firms often apply for additional students to fill them. The men under whose supervision the students have been in their outside work are practically unanimous in approval of our plan, and speak highly of the enthusiasm, earnestness and intelligence the students have shown in the performance of their duties.

Working Relations

When a student is first assigned to a firm, the School gives him general information in regard to the work and a letter of introduction. At the first interview the student is expected to familiarize himself with the kind of work on which he is to be engaged while with the firm, and the conditions under which he is to work. It is expected that no student will accept employment through the school unless he can and will continue in School and with the firm in question throughout the year in accordance with the general plans of Engineering Practice. During the periods of Engineering Practice the students report for work at the regular working hours of the firm, no special privileges being granted. Students are not permitted to discontinue Engineering Practice except under unusual conditions and only by previous arrangements with the School. *In all cases of absences from Engineering Practice, whether unavoidable or not, the student or a member of his family is required to notify the employing firm by telephone immediately at or before the time of the occurrence of the absence.* This matter of notifying the employing firm immediately is very important. Failure to do so is sufficient cause for dismissal.

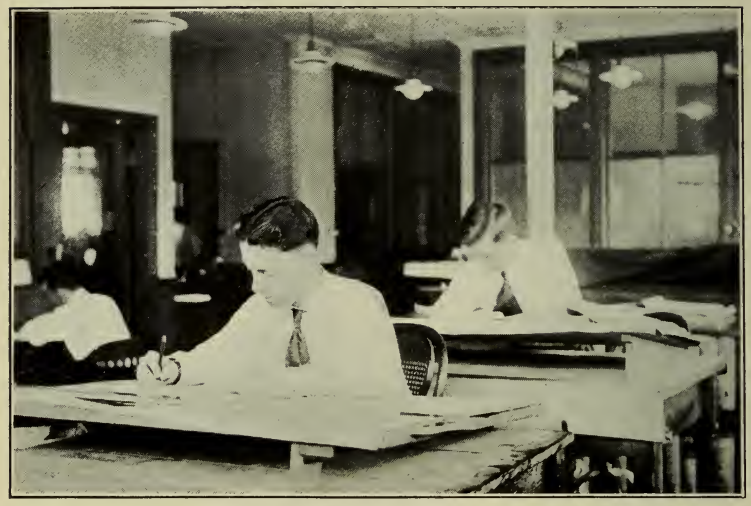
The school places the student at work with the employing firm and is responsible for his presence and conduct at work as well as the quality and scope of his work. All difficulties arising in regard to students who are in Engineering Practice are taken up with the School at the next following school period. *It is absolutely necessary that each student be prepared to ful-*

Students Engaged in Engineering Practice

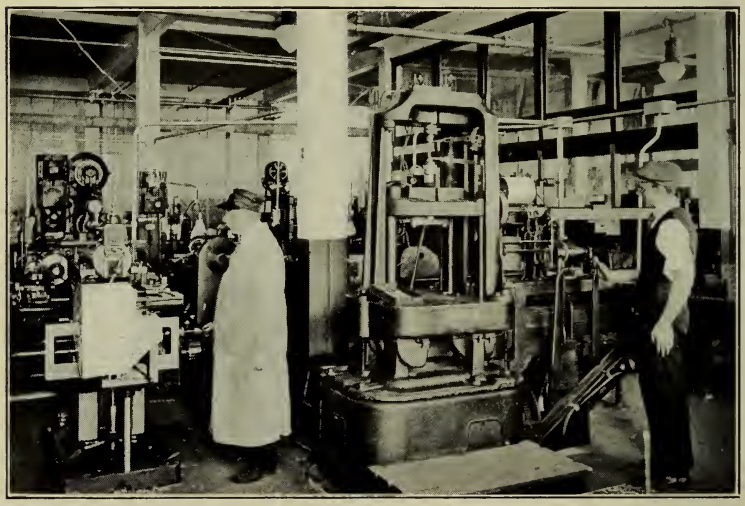
Making a High Tension Test
Edison Electric Illuminating Company

Drafting
Designing Engineer's Office—B. & A. Railroad

Students Engaged in Engineering Practice



Machine Designing
Kinney Manufacturing Company—Boston



Making Tensile Tests on Steel
General Electric Company—Lynn

fill his engineering practice obligations as faithfully during the summer months as at any other time, and no student can ordinarily expect any longer vacation than the regular four weeks specified during the summer.

Students in the sophomore, junior and senior years are almost invariably placed with firms which give them experience directly in line with the course of study followed at school.

Freshmen, as a rule, are assigned to work not so technical in character, but designed to train the younger men in the fundamental qualities of cheerfulness, dependability, enthusiasm, and grit. These attributes are essential to the successful completion of the upper class work. They are emphasized at every opportunity during the student's college life in connection with his engineering practice, and the first year's training is designed especially to develop these habits. If a young man can form the habits of mental and physical alertness and reliability, he has laid a sure foundation for his success and happiness in after life. The detailed technical information and experience is added in the three upper years.

In general, all changes and transfers in Engineering Practice are made at the beginning of the school year in September.

Earnings

The firms treat our students as they do their other employees in manner of payment, rates of pay, chances for promotions, etc. Each firm makes individual arrangements with the student, and the School does not attempt to supervise except for occasional consultations with the employers over general policies.

The rates of pay for students in the School are kept low so that the employer feels justified in devoting time to the instruction of the students and in transferring students from one department to another at approximately regular intervals.

By agreement with the co-operating firms the following minimum wages are paid to the students.

$10 per week for the first school year.
12 per week for the second school year.
14 per week for the third school year.
16 per week for the fourth school year.

Ordinarily a student starts with each firm at the minimum wage and is promoted as his ability may warrant. In certain cases the students receive less than the minimum stated above, but this is usually made up to them in some other way.

No upper limit of wages is set. The average maximum is $18 to $20 even for men of exceptional ability, because the students are given the privilege of attending school on the co-operative plan and of being transferred from one department to another. The sum earned is more than enough to pay the tuition and the necessary expenses of schooling, but does not cover the cost of living.

Schedules of Engineering Practice

Below are typical schedules of Engineering Practice that have been prepared for our students by some of the companies which are giving them employment:

Boston & Maine Railroad Co.

One Year	Erecting Dept.
One Year	Machine Dept.
One Year	Machine Dept.
One Year	Drafting Room

Simplex Wire & Cable Co.

One Year	Insulating Dept. Braiding Dept.
One Year	Cable Shop Twisting Dept.
One Year	Machine Shop Construction Gang Electrical Construction Gang
One Year	Testing Room

The Dennison Manufacturing Co.

One Year	Carpenter's Helper Pattern Maker's Helper and Case Making Mill-wright Work and Elevator, Fire Door Inspection Helper in Electrical Dept.
One Year	Machine Shop Stock Room Machine Shop Grinding Room
One Year	Power Plant Work Accident Prevention Work Filing Plans, Blue Prints, Tracing, Etc. Planning Dept. Work
One Year	Tracing and General Work Detailing and General Drafting

Crofoot Gear Works

One Year	Inspection Dept.
	Finishing Dept.
One Year	Hobbing Dept.
	Cutting Dept.
One Year	General Grinding Dept.
	Tool Making

Simplex Electric Heating Co.

One Year	Machine Dept.
One Year	Grinding Dept.
	Stock Dept.
	Winding Dept.
	Enameling Dept.
	Assembling Dept.
One Year	Testing Dept. First Division
	Testing Dept. Second Division
One Year	Shipping Dept.
	Drafting Dept.
	General Shop Experience

Boston & Albany Railroad Co.

One Year	Work in Field Party
One Year	Work in Drafting Room
One Year	Masonry Inspection
	General Railroad Work
	Railroad Accounting
One Year	Railroad Accounting
	Timekeeping and Unit Costs

Condit Electrical Manufacturing Co.

One Year	Testing D. C. Apparatus
	Testing A. C. Apparatus
One Year	Switchboard
	Construction
	Installation
One Year	Blue Printing
	Drafting
One Year	Engineering
	Engineering Specifications

Co-operating Firms

Aberthaw Construction Company (Civil)
Acme Apparatus Company, Cambridge (Electrical)
American Acid Company, Medford (Chemical)
American Agricultural Chemical Company (Chemical)
American Glue Company, Peabody (Electrical)
American Radio & Research Corporation (Electrical)
American Steam Gage & Valve Company (Mechanical)
Appleton, Thomas A., Civil Engineer, Salem (Civil)
Arlington Foundry (Chemical and Mechanical)
Arnold Machine Shop, Rockland (Mechanical)

Aspinwall & Lincoln, Civil Engineers (Civil)
Barnes, Rowland H., Civil Engineer (Civil)
Bates, C. J., & Sons, Chester, Conn. (Mechanical)
Bates, Walter C., Surveyor (Civil)
Beacon Oil Company, Everett (Chemical)
Bethlehem Shipbuilding Corporation (Civil, Mechanical, Electrical)
Blanchard Machine Company, Cambridge (Mechanical)
Boston & Albany Railroad (Civil)
Boston Consolidated Gas Company (Chemical)
Boston Fuel Testing Company (Chemical)
Boston India Rubber Company (Chemical)
Boston & Maine Railroad (Mechanical and Civil)
Boston University—Laboratory (Chemical)
Boston Varnish Company, East Everett (Chemical)
Branch, Ernest W., Civil Engineer, Quincy (Civil)
Broadway Iron Foundry, Cambridge (Mechanical)
Buff & Buff Manufacturing Company, Jamaica Plain (Civil)
Burgess, W. J., Quincy (Chemical)
Butt, H. G., Manufacturing Company (Mechanical)
Cadillac Automobile Company (Mechanical)
Chase-Shawmut Company, Newburyport (Electrical)
Coffin Valve Company, Neponset (Mechanical)
Conant Machine Company, Concord (Mechanical)
Condit Electrical Manufacturing Company (Electrical)
Crittenden Manufacturing Company (Mechanical)
Crocker, H. S., Brockton City Engineer (Civil)
Crocker Pen Company, Everett (Mechanical)
Crofoot Gear Works, Hyde Park (Mechanical)
Crosby Steam Gage & Valve Company, Charlestown (Mechanical)
Cross, W. W., Brockton (Mechanical)
Dennison Manufacturing Company (Mechanical and Chemical)
Eastman & Bradford, Civil Engineers, Lynn (Civil)
Edison Electric Illuminating Company (Electrical, Mechanical and Chemical)
E. I. du Pont de Nemours Company, Portland (Mechanical)
Electric Maintenance Company (Electrical)
Elliot, C. J., Civil Engineer (Civil)
Ellis Manufacturing Company, Milldale, Conn. (Mechanical)
Evans, R., Essex County Engineer, Salem (Civil)
Farnham, Ralph J., Civil Engineer, Wellesley (Civil)
Fuller, George A., Company, Constructors (Civil)
Gannett, Charles H., Civil Engineer (Civil)
General Electric Company, Lynn (Electrical, Mechanical and Chemical)
Glenlyon Dye Works, Saylesville, R. I. (Chemical)
Goldblatt, Max L., Civil Engineer (Civil)
Green Manufacturing Company, Bellows Falls, Vt. (Mechanical)
Holtzer Cabot Electric Company (Electrical)
Hood Rubber Company (Mechanical)
Hume Body Corporation (Mechanical)
Hunt-Spiller Corporation, Iron Founders (Chemical)
Hygrade Lamp Company, Salem (Electrical)
Industrial Engineering Corporation (Chemical)
Jenney Electrical Manufacturing Company, Brockton (Electrical)
Jonsberg, F. F., Company, Engineers (Civil)

Kinney Manufacturing Company, Jamaica Plain (Mechanical)
Knott, L. E., Apparatus Company, Cambridge (Chemical and Mechanical)
Landers, Frary & Clarke, New Britain, Conn. (Mechanical)
Lawton Mills Company, Plainfield, Conn. (Mechanical)
Leonard Engineering Company, Everett (Civil)
Lever Brothers, Soap Manufacturers (Chemical)
Lewis, Green, McAdams & Knowland (Chemical)
Lewis-Shepard Company (Mechanical)
Lustron Chemical Company (Chemical)
Lynn, City of, Water Dept. (Civil)
Manhassett Manufacturing Company, Putnam, Conn. (Electrical)
Massachusetts Institute of Technology (Chemical)
Massachusetts Public Works Dept. (Civil)
Massachusetts State Board of Health (Civil)
McClinock & Woodfall, Civil Engineers (Civil)
Merchant, A. P., Company (Electrical)
Merrimac Chemical Company, North Woburn (Chemical)
Mertin, Dr. Rudolph (Chemical)
Monks & Johnson, Structural Engineers (Civil)
Morgan Construction Company, Worcester (Mechanical)
Moss Electrical Company, Putnam, Conn. (Electrical)
New England Coal & Coke Company (Chemical)
New England Structural Company (Mechanical)
Newton City Engineer (Civil)
Norfolk Iron Works, Quincy (Civil)
Northeastern College Laboratories (Civil, Mechanical, Electrical and Chemical)
Norwood Town Engineer (Civil)
Old Colony Foundry, East Bridgewater (Mechanical)
Old Colony Tool Company, Taunton (Mechanical)
Paver's Machine Shop, Franklin (Mechanical)
Perry, G. W., City Engineer, Putnam, Conn. (Civil)
Plymouth Cordage Company (Mechanical)
Plymouth Rubber Company, Canton (Chemical)
Plymouth Town Engineer (Civil)
Pneumatic Scales Corporation (Mechanical)
Portland Sales Company, The (Chemical and Mechanical)
Potter, H. S., Company (Electrical)
Punchard, William H., Landscape Architect (Civil)
Putnam Machine Company, Fitchburg (Mechanical)
Salem Electric Light Company (Electrical)
Salem Gas Light Company (Chemical)
Samson Electric Company, Canton (Electrical)
Sampson, George T., Civil Engineer, Medford (Civil)
Sanborn Company, Instrument Manufacturers (Mechanical and Chemical)
Sherry, Frank E., Civil Engineer (Civil)
Simplex Electric Heating Company, Cambridge (Electrical)
Simplex Wire and Cable Company, Cambridge (Electrical)
Simpson Brothers Corporation (Civil)
Solon Lumber Company, Solon, Maine (Mechanical)
Starret, L. S., Tool Company, Athol (Mechanical)
Stevens Duryea Company, Chicopee Falls (Mechanical and Electrical)
Sturtevant, B. F., Company, Hyde Park (Mechanical and Electrical)

Sylvester Tower Company, Cambridge (Mechanical)
Trimont Manufacturing Company, Roxbury (Mechanical)
Trufant, A. P., Civil Engineer, Brockton (Civil)
Tuck & Gilman, Architects (Civil)
Turner Construction Company (Civil)
United Shoe Machinery Company, Beverly (Electrical and Mechanical)
United States Envelope Company (Mechanical)
Vega Musical Instrument Company (Civil)
Vennard, William L., City Engineer, Lynn (Civil)
Victor Shoe Machinery Company, Lynn (Mechanical)
Wade American Manufacturing Company, Waltham (Mechanical)
Waltham Watch Company, Waltham (Mechanical and Chemical)
Warren Brothers Company, Paving Materials Laboratory (Chemical)
Werby Laboratories (Chemical)
Westinghouse Electric Manufacturing Company, Springfield (Electrical)
Whitman and Howard, Civil Engineers (Civil)
Wollaston Foundry Company, Norfolk Downs (Mechanical)
Worcester Electric Light Company (Electrical)

REQUIREMENTS FOR ADMISSION

General Statement

In general, the preparation necessary to enable an applicant to pursue successfully one of the regular courses in the School corresponds to the four-year course of study offered by high schools of the better grade. The requirements of age and scholarship are regarded as the minimum in all ordinary cases, and only exceptional circumstances will justify any relaxation. Parents and guardians are advised that it is generally for the ultimate advantage of the student not to enter under the age of sixteen years. Every applicant must furnish references as to his character and ability, and must show cause why he may reasonably be expected to make a success of his course, both in the School and in Engineering Practice. He must be willing and able to work hard, both mentally and physically.

Admission to the First Year

Students are admitted to the first year in all courses at the opening of the Fall Term in September. At the opening of the Spring Term in January, a beginning class is also usually admitted to the Mechanical and Electrical Courses. An applicant for admission as a regular student to the School is required to present evidence of graduation from an accredited four-year high school, or the equivalent, and to have included in his course of study Algebra, as far as Quadratics, and Plane Geometry. The completion of fifteen units of preparatory subjects satisfactory to the Committee on Admission is considered equivalent qualification. Students whose high school courses have not included the required Algebra and Plane Geometry must take special entrance examinations, the dates of which are scheduled elsewhere in this catalog. Certificates of entrance examinations passed for admission to colleges, or technical schools of good standing, may be accepted in lieu of entrance examinations.

In exceptional cases a student who is not a high school graduate may be allowed to enter as a special student, but only after his case has been passed on favorably by the Committee on Admission and the Dean. Every applicant is urged to remain in high school until he is graduated even though he might be able to qualify for entrance before receiving his high school diploma.

A student obtaining a low rating on his entrance examinations, or who may not be eligible to assignment to Engineering Practice for other reasons, may by special permission be allowed to attend school either every period or every alternate period. When a student's record justifies such a procedure, he may be assigned to Engineering Practice.

Application for Admission

Each applicant for admission to the School is required to fill out an application blank, whereon he states his previous education, as well as the names of persons to whom reference may be made in regard to his character and previous training.

An application fee of five ($5) dollars is required when the application is filed. This fee is non-returnable if the applicant is accepted. If he is rejected, one-half the fee with be returned.

The last page of this catalog is in the form of an application blank. It should be filled out in ink and forwarded with the required five dollar deposit, to Carl S. Ell, Dean, 316 Huntington Avenue, Boston, Mass.

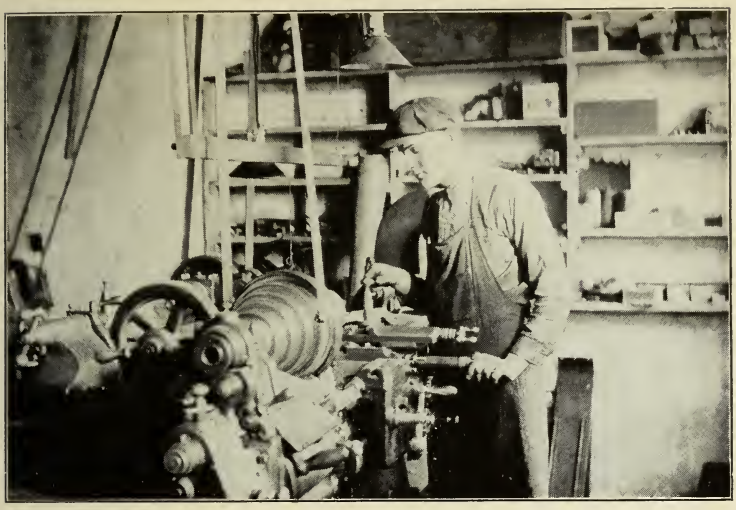
Upon receipt of the application, properly filled out, the School at once looks up the applicant's references and high school records. When replies have been received to the various inquiries instituted, the applicant is at once advised as to his eligibility for admission to the School. All applicants must meet the Dean for a personal interview before being finally accepted by the School. This interview may be postponed if desired until the opening of School in the fall.

First Tuition Payment

Should a student wish to be assigned to a position with a co-operating firm before the regular opening of School, he is required to fill out a registration card and also an application for membership in the Boston Y. M. C. A. The first payment of tuition must be paid before he will be assigned to any position at Engineering Practice.

Before any student shall be allowed to attend classes, he shall have made the first tuition payment. This is in addition to the application fee of five (5) dollars and the Student Activities fee of ten (10) dollars, and may be paid at any time before school opens.

Mechanical Engineering Students



Operating a Lathe
H. G. Butt Mfg. Company

Wood Working
Pattern Shop—Boston Elevated Railway Co.

Chemical Engineering Students

Testing Road Materials
Warren Bros.—Paving Materials

Analyzing Metals
General Electric Company—Lynn

Birth and Educational Certificates

The law in regard to the hours and conditions of labor by minors makes it necessary that all students under twenty-one years of age shall obtain Educational Certificates before they can be accepted by co-operating firms. For those students who live outside of Boston, it will save time and trouble if they bring a Certificate of Birth, or an Educational Certificate, with them on coming to Boston. The Educational Certificates are obtained free, upon request, from the Superintendent of Schools in the city, or town, where the student lives, if he lives in Massachusetts. For students living in other states a Certificate of Birth, or its equivalent, is all that will be necessary.

Subjects for Examination

Applicants who have not passed algebra to quadratics and plane geometry satisfactorily in their courses of study in high school are required to pass entrance examinations in these subjects.

By writing the School, prospective applicants may receive copies of former entrance examinations. These copies are available for distribution and may be obtained at any time.

The detailed requirements in these subjects are as follows:

Algebra

The four fundamental operations for rational algebraic expressions; factoring, determination of highest common factor and lowest common multiple by factoring; fractions, including complex fractions; ratio and proportion; linear equations, both numerical and literal, containing one, or more, unknown quantities; problems depending on linear equations; radicals, including the extraction of the square foot of polynomials and numbers; exponents, including the fractional and negative.

Plane Geometry

The usual theorems and constructions of good text-books, including the general properties of plane rectilinear figures; the circle and the measurement of angles; similar polygons; areas, regular polygons and the measurement of the circle. The solution of numerous original exercises, including loci problems. Applications to the mensuration of lines and plane surfaces.

Entrance Examinations in Boston

Examinations for admission to the first year class will be held at 316 Huntington Avenue on June 16 and on September 8, 1921.

Students are advised to attend the June examinations, if possible, in order that any deficiencies then existing may be made up in September, before entrance.

The time of examinations is as follows:

Thursdays, June 16, 1921—
10:00 a. m. to 12:00 m., Algebra;
1:00 p. m. to 3:00 p. m., Plane Geometry.

Thursday, September 8, 1921—
10:00 a. m. to 12:00 m., Algebra;
1:00 p. m. to 3 :00 p. m., Plane Geometry.

No fees are to be paid at the time of the examination.

Summer Preparatory Schools

There are day and evening summer preparatory schools, conducted by the Northeastern Secondary School, and students having entrance conditions, or requiring further preparation for the entrance examinations, may avail themselves of this opportunity to cover the desired work.

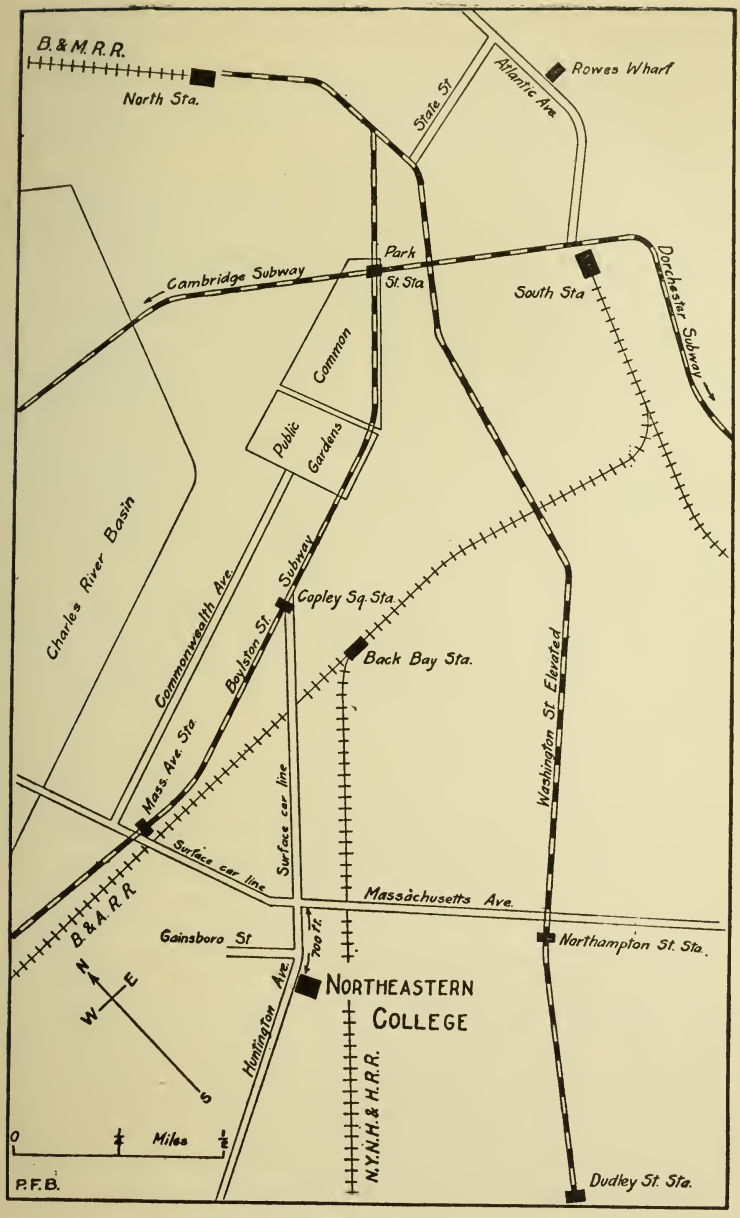
Provisional Acceptance

When, for any reason, it is deemed advisable, the School reserves the right to accept any entering student provisionally for a period extending from one to three months before placing him at Engineering Practice. Whether he shall be placed at work at the end of this time or not will be determined by the character of the work that he has accomplished during this provisional period.

SCHOOL INFORMATION IN DETAIL

Location

The buildings are located on Huntington Avenue, at Gainsborough and St. Botolph Streets, just beyond Massachusetts Avenue, and are within easy access to the various railroad stations, and the business and residential sections. A map is shown on the opposite page.


B. & M. R. R.
North Sta.
State St.
Atlantic Ave.
Rowes Wharf
Cambridge Subway
Park St. Sta.
South Sta.
Dorchester Subway
Common
Public Gardens
Charles River Basin
Commonwealth Ave.
Boylston St. Subway
Copley Sq. Sta.
Back Bay Sta.
Mass. Ave. Sta.
Surface car line
Surface car line
Washington St. Elevated
Massachusetts Ave.
B. & A. R. R.
Gainsboro St.
700 Ft.
Northampton St. Sta.
NORTHEASTERN COLLEGE
Huntington Ave.
N.Y.N.H. & H.R.R.
N
W
E
S
0
Miles
P.F.B.
Dudley St. Sta.

Residence

It has been found to be much more satisfactory for the student to live within easy access of Boston, than to live out twenty-five or thirty miles. The saving of time and effort more than offset any increased expense.

There are excellent accommodations at very moderate rates in the dormitories in our new building. These rooms may be had separately or in groups with a common reception room. The price varies from $2.75 per week, upwards.

Residence in the dormitories gives the student opportunity to use the drafting rooms and laboratories outside of class hours, and to confer easily with his instructors about his college work. It also gives him a wider range in the choice of a co-operating position since he can readily report for work at 7 a. m. if necessary, which is impossible for those living at a distance. Moreover dormitory residence gives the student close connection with the activities of college life, such as the college paper, orchestra, athletics and so forth.

For these reasons it is ordinarily requisite that students, especially the freshmen, shall live at the dormitories or nearby, but by special permission from the Dean arrangements can be made to live at home, and very often co-operating firms can be found nearby for such men.

The School officials have no authority in the matter of dormitory assignments. Students should write the House Secretary for rooms in the dormitories. The Y. M. C. A. maintains a registry of suitable rooms in nearby houses which may be consulted in the Social Office on the first floor.

School Year

The school year is of forty-eight weeks duration divided into twenty-three weeks of school work and twenty-five weeks of engineering practice. Thus each student gets four-weeks vacation each year. The twenty-three weeks of school work consist of a Fall Term of ten weeks, a Spring Term of ten weeks, and a Summer Term of three weeks. The arrangement of these terms can be found on the yearly calendar at the front of this catalog, in different kinds of type.

The Fall Term begins each year on the second Monday in September. This is the beginning of the school year for all students. The school year closes with a Summer Term of three weeks.

Attendance

Students are expected to attend all exercises in the subjects they are studying, unless excused by the Registrar. Exercises are held, and students are in general expected to devote themselves to the work of the School, between 9:00 a. m. and 4:30 p. m. with a one-hour lunch period, on every week day except Saturday. Saturday classes are held only between 9:00 a. m. and 1:00 p. m.

Four-Year Courses

The school offers regular four-year courses in four branches of engineering, leading to the following degrees:

I. Bachelor of Civil Engineering.
II. Bachelor of Mechanical Engineering.
III. Bachelor of Electrical Engineering.
IV. Bachelor of Chemical Engineering.

Descriptions of these courses and schedules showing the subjects of instruction included will be found on succeeding pages.

Tuition Fees

The tuition fee in each course is one hundred and seventy-five dollars ($175) per year for each of the four years and must be paid by entering students as follows: sixty dollars ($60) before assignment to Engineering Practice or at the beginning of the first school period; fifty dollars ($50) at the beginning of the second school period; forty dollars ($40) at the beginning of the third school period and twenty-five dollars ($25) at the beginning of the fourth school period.

All students who were in attendance at the School June 1, 1920, will be permitted to complete their courses of study at the same rate of tuition as was charged when they first registered in the School but all such students will be charged a tuition fee of twenty dollars ($20) for the Summer Term in

addition to the regular tuition. The tuition fee for all such students in the four-year courses is payable as follows: sixty dollars ($60) at the beginning of the first school period; thirty-five dollars ($35) at the beginning of the second school period; thirty dollars ($30) at the beginning of the third school period, and twenty dollars ($20) at the beginning of the fourth school period.

Failure to make the required payments on time renders the student liable to be barred from his classes or suspended from Engineering Practice until the matter has been adjusted with the Bursar.

The tuition fee includes the regular $5.00 membership in the Boston Y. M. C. A. and the $6.00 Gymnasium fee.

Student Activities Fee

Each student in the School is charged a student activities' fee of ten dollars ($10). This fee is payable at the time of registration and is non-returnable. It supports certain student activities and includes membership in the "NORTHEASTERN ENGINEERING A. A." and subscription to the school paper, the "NORTHEASTERN TECH."

Chemical Laboratory Fee and Breakage Deposit

All students taking chemical laboratory work are required to make a deposit of five dollars ($5) at the beginning of each year from which deductions are made for breakage and destruction of apparatus in the laboratory. Any unused portion of this deposit is returned to the student at the end of the school year. In case the charge for such breakage or destruction of apparatus is more than five dollars ($5), the student is charged the additional amount.

Students enrolled in the course in Chemical Engineering will be charged a laboratory fee in accordance with the following rates:

Course		*Fee*
41-2	Inorganic Chemical Laboratory	$ 5.00
42-2	Qualitative Analysis Laboratory	10.00
43-2 and 44-2	Quantitative and Technical Analysis combined	5.00
45-2	Organic Chemical Laboratory	10.00
45-4	Organic Chemical Laboratory	5.00
47-2	Industrial Chemical Laboratory	5.00

Electrical Laboratory Fee

All students taking electrical laboratory work will be charged a laboratory fee in accordance with the following rates:

	Course	*Fee*
30-4	Applied Electricity Laboratory	$5.00
32-2	Electrical Engineering Laboratory	2.50
32-4	Electrical Engineering Laboratory	5.00
32-6	Electrical Engineering Laboratory	5.00
32-8	Electrical Engineering Laboratory	10.00
33-2	Electrical Measurements Laboratory	5.00

Payments

All payments should be made to Galen D. Light, Bursar.

All checks should be made payable to The Bursar, Northeastern College.

Refunds

As the College assumes the obligation of carrying the student throughout the year when the student registers and as the College provides the instruction and accommodations on a yearly basis, the Committee on Refunds has ruled as follows:

A. Applications for refunds must be presented within sixty days after withdrawal from school.

B. Credits or refunds may be granted only as stated below:

1. The unused portion of the tuition paid by the applicant may be placed in suspense and used at some future time by the applicant to apply upon tuition in any school in Northeastern College, provided it is used within two years. This action is taken providing the reasons as set forth in the application meet with the approval of the Committee on Refunds.

2. Cash refunds may be granted only in cases where students are compelled to withdraw on account of personal illness. The application must be accompanied by a satisfactory certificate from a physician.

Books and Supplies

All supplies may be purchased at the College Book Store at a cost of twenty ($20) to twenty-five dollars ($25) per year. The supplies for the freshman year cost somewhat more than this because a set of drawing instruments must be obtained. The earnings of the students for their services with the co-operating firms considerably exceed the cost of tuition, fees, the cost of books and supplies, and incidental expenses. The purchase of supplies is therefore not a burden to the student.

Elective Subjects

Students electing any subject not included in their regular schedule will be required to take all examinations in that subject, and to attain a passing grade, before they will be eligible for a degree.

Status of Students

The ability of students to continue their courses is determined by means of daily work and examinations, but regularity of attendance and faithfulness to daily duties are considered equally essential.

When a student elects a course, he is required to complete all subjects in that course not indicated as "Optional," in order to be graduated. No subject is to be dropped, or omitted, without the consent of the Committee on Scholarship and the approval of the Dean.

Any student failing to make a satisfactory record, either in school or practical work, may be reomved from his position in practical work, or from the school.

Students transferring from approved colleges will be admitted to advanced standing in their courses. Whenever a student enters with advanced standing and it is found that he shows inadequate preparation in any of his pre-requisite subjects, the faculty reserves the right to make the student repeat in class the pre-requisite subject in which he is deficient.

A special student is permitted to attend the School, subject to the approval of the faculty, and may be permitted to take such subjects as the School offers under the supervision of the Scholarship Committee.

Probation

Any student whose report of standing does not meet the standard set by the Scholarship Committee, will, except for special reasons, as, illness, enforced absence or similar causes ordinarily beyond the student's control, be placed on probation.

While on probation, a student is expected to confine himself strictly to his studies, and is debarred from representing the College in any public capacity or from taking any active part in any of the various Student Activities.

A student will only be removed from probation by action of the Scholarship Committee, in general, upon a definite recommendation by his Advisor.

If a student remains upon probation for two five-week periods of his Division consecutively, he will be placed upon the list of Special Students and no longer considered as a candidate for a degree of the School. His program of studies will be reduced to such extent as the Scholarship Committee considers suitable according to their estimate of his ability.

When at the beginning of any five-week period a special student shall be found to have completed satisfactorily the required work for a degree up to said five-week period, he may be restored to the list of candidates for a degree.

Examinations

Examinations covering the work of the term are usually held at the close of each term. Exceptions may be made in certain courses where, in the opinion of the instructor, examinations are not necessary.

Condition examinations for all courses are given during the afternoons of the second week in September for Division A, and of the third week in October for Division B, but condition examinations are not given for courses in which no final examination is given. Condition examinations for all courses which end with the Fall Term are also given the second week in May for Division A, and the second week in June for Division B. Special examinations can be arranged for only by vote of the Committee on Scholarship, and for all such examinations the College requires the payment of a special fee of five dollars ($5).

Rules of Standing in Scholarship

A student's grade is officially recorded by letters and percentages, as follows:

A, excellent, 90-100 per cent.

B, good, 80-89 per cent.

C, fair, 70-79 per cent.

D, passable, 60-69 per cent.

E, work incomplete or unsatisfactory, 40-59 per cent.

F, complete failure, below 40 per cent.

A mark of E in any particular subject entitles the student to make up the unsatisfactory work, or to take a condition examination. This letter is given for all grades below 60 per cent on intermediate reports.

A mark of F denies the privilege of taking a condition examination, and the whole course must be repeated.

A student who does not remove a condition before that course is repeated a year later, must take the course over again. A condition in more than one subject involves the loss of the privilege of being a candidate for graduation with the student's class, and may involve the loss of assignment to Engineering Practice.

The responsibility for the removal of a condition rests with the student, who is required to ascertain when and how the condition can be removed.

No student may qualify as a candidate for a degree in any given year unless clear in all the required subjects of the lower years of his chosen course. He must also be in good standing in all courses for which he is enrolled.

Entrance requirements or preparatory subjects pursued in the School are considered as required school work.

Absences

No "cuts" are allowed, and a careful record of attendance upon exercises is kept for each student. Absence from exercises regularly scheduled in any subject will seriously affect the standing of a student, and may cause the removal of the subjects from which he is absent from his schedule and the

listing of these subjects as conditioned subjects. In case he presents a reasonable excuse for the absence, however, he may be allowed to make up the time lost and be given credit for the work; but he must complete the work at such time and in such manner as his instructor in the subject, with the approval of the Head of his course, shall designate. Laboratory work lost can only be made up when it is possible to arrange for the necessary time during hours when these departments are open for regularly scheduled instruction. Absences from exercises immediately preceding or following a recess are especially serious and entail severe penalizing.

Attendance at all Mass Meetings of the student body is compulsory. Exceptions to this rule are made only when the student has received permission from the Registrar, previous to the meeting from which he desires to be absent.

Reports of Standing

Reports of standing of all students are issued four times a year, which will be at the end of each five-week school period. In addition to these regular stated periods, a special report on the subjects taken during the summer term will be issued immediately at the close of the summer term. All questions relative to marks are to be discussed with the student advisor who, in turn, will make all necessary recommendations to the Scholarship Committee.

When a student fails to pass in any subject, a notification may be sent to his parents, or guardian, to that effect, so that we may have the home influence exerted to bring his work up to a higher rating.

Every effort is made to keep the student up in his studies. Parents and students are always welcomed by the Dean for conference upon such matters. Special reports on a student's work will be sent to parents at any time, upon request.

Parents or guardians will be notified in all cases when students are advised, or required, to withdraw from the School.

Conduct

It is assumed that students come to the School for a serious purpose, and that they will cheerfully conform to such regu-

lations as may from time to time be made. In case of injury to any building, or to any of the furniture, apparatus, or other property of the School, the damage will be charged to the student, or students, known to be immediately concerned; but if the persons who caused the damage are unknown, the cost for repairs may be assessed equally upon all the students of the School.

Students are expected to behave with decorum, to obey the regulations of the School, and to pay due respect to its officers. Conduct inconsistent with the general good order of the School, or persistent neglect of work, if repeated after admonition, may be followed by dismissal, or, in case the offense be a less serious one, the student may be placed upon probation. The student so placed upon probation may be dismissed if guilty of any further offense.

It is desired to administer the discipline of the School so as to maintain a high standard of integrity and a scrupulous regard for truth. The attempt of any student to present, as his own, any work which he has not performed, or to pass any examination by improper means, is regarded as a most serious offense, and renders the offender liable to immediate expulsion. The aiding and abetting of a student in any dishonesty is also held to be a grave breach of discipline.

Advisors

Upon entering the School each student is assigned to a faculty member as his Advisor, who is expected to take an active interest in the student's welfare from all points, and not only guide and assist him in the satisfactory pursuit of his studies, but keep a close watch on all matters which might tend to hamper the student in his College life and see that such hampering does not occur so far as possible.

In the upper years the function of the Advisor is somewhat different and tends more toward consultation and suggestions bearing on the student's plans and probable work after graduation.

STUDENT ACTIVITIES

A moderate participation in social and athletic activities is encouraged by the Faculty, although a standard of scholarship which is incompatible with excessive devotion to such pursuits is required of the students.

Student Activities Committee

The student body has organized a number of groups, or clubs, all of which come under the jurisdiction of the Student Activities Committee. This committee consists of students elected from the various classes, and has general supervision over all social functions of the School. The committee has opened a Student Activities Room, a club room for all members of the School, in which current periodicals, magazines, and engineering books of interest to the young engineer are available for the student's use during his leisure moments. The committee has also formed the Musical Clubs, which consist of an orchestra, a band, a banjo and mandolin club, and a glee club. In order to provide for the social intercourse of the students, as well as to enable the men in the different divisions to meet one another, socials and entertainments are held for their exclusive enjoyment.

The Northeastern Engineering A. A.

The athletic association consists of all members of the School. At the head of the association is the Northeastern Engineering A. A. Council, consisting of members elected from the student body. This council has complete charge of all athletics. Under the guidance of efficient athletic coaches, track, basket-ball, swimming, and baseball teams are formed and schedules are arranged with other colleges for home games and games abroad. The association also encourages wrestling, interclass baseball and football, and tennis teams. Interclass and interdivision meets are held, as well as a field day near the close of the college year.

The Northeastern Tech.

The students issue a weekly paper, called the "Northeastern Tech." Here the students have an opportunity to express their opinions on subjects relating to study, engineering prac-

tice, social events, or topics of the day. In addition, pertinent articles by prominent men, as well as college notes and information, make this feature of student activities very valuable. Positions on the editorial staff of the paper are attained by competitive work.

Student Activities Fund Committee

In order to finance the foregoing student activities, this Student Activities Fund Committee has been formed, and consists of elected representatives from the Student Activities Committee, the Northeastern Engineering A. A., and the Northeastern Tech. This committee apportions the Student Activities Fee among the various activities. Thus the Musical Clubs, the Student Activities Room, the athletic teams, and the college paper, are supported by proper apportionment of the ten-dollar fee paid by each student at the beginning of the college year.

Student Council

This is the student governing body, and comprises the officers of the senior and junior classes and the members of the Student Activities Committee. The president of the senior class is its chairman. It has jurisdiction over all student matters, as customs, privileges, or such other matters which can appropriately be decided on by such a body.

The Pan-Hellenic Council

A representative from each fraternity, as well as an elected non-fraternity man from each division make up the Pan-Hellenic Council. It has preliminary jurisdiction over laws governing the regulation of fraternities and clubs in the College.

The Cauldron

"The Cauldron" is the year book of the School. It is published annually by the Senior Class, and is ready for distribution in the latter part of the spring term. This publication carries the usual review of the year's work and activities, classes, socials, etc. It also includes a complete individual history of the entire graduating class and is a souvenir highly prized in later years by all graduates.

Professional Society

The students in the various courses with the evening school students and alumni have organized a professional society known as the Northeastern College Engineering Society for the closer association of the students of the School, and for the discussion and consideration of various problems and new knowledge in the Engineering Field. Meetings are held every few weeks, at which the members are addressed by engineers and other men of prominence. There are four sections of the society, one for each course in the School, namely: The Civil Engineering Section, the Mechanical Engineering Section, the Electrical Engineering Section, the Chemical Engineering Section.

REQUIREMENTS FOR GRADUATION

The School grants the degrees of:

Bachelor of Civil Engineering.
Bachelor of Mechanical Engineering.
Bachelor of Electrical Engineering.
Bachelor of Chemical Engineering.

To receive the degree of the School the student must attend the School not less than one year, which must be that immediately preceding his graduation. He must complete the prescribed studies of the four years, and must, also, pass final examinations, if required, on subjects pertaining especially to his course. In addition to this, he must complete satisfactorily a schedule of Engineering Practice under the supervision of the Faculty. The student must, also, prepare a thesis on some subject included in his course of study, or an account of some research made by him, or an original report upon some machine, a work of engineering, or an industrial plant. This thesis, or design, must be approved by the Dean. All these and records of work done in preparation of theses, are the permanent property of the School.

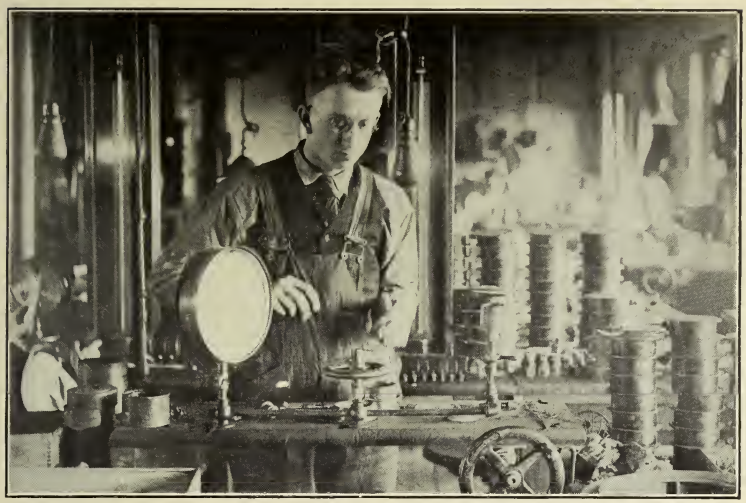
The degree of the School represents not only the formal completion of the subjects in the selected course of study, but also the attainment of a satisfactory standard of general efficiency. Any student who does not show in the fourth-year

work of his course that he has attained such a standard, may be required, before receiving the degree, to take such additional work as shall prove his ability. A fee of ten dollars ($10) is required of all candidates for a degree. This fee must be paid at the beginning of the spring term.

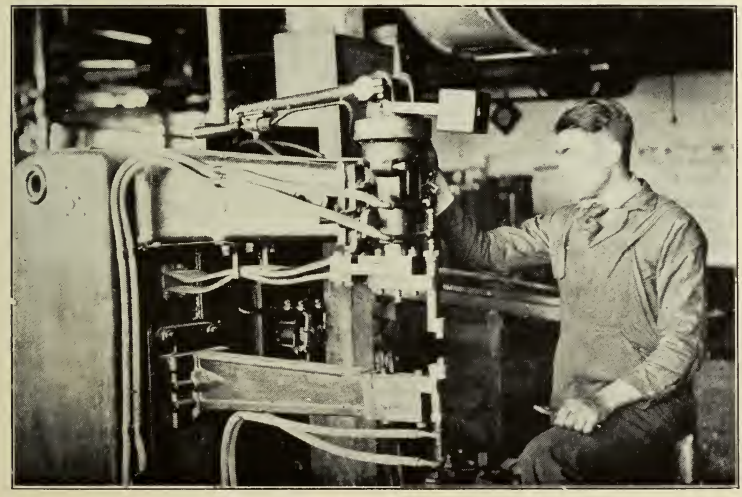
POSITIONS HELD BY GRADUATES

The graduates of the School have been able to secure positions of the same grade, commanding the same salaries, as the graduates of other good technical schools. Among the positions now filled by graduates of the School are: Construction engineers, electrical engineers, power plant engineers, designing draftsmen, State and Federal employees under the Civil Service, and instructors. The success of those who have been graduated from the School is the best evidence of the value and thoroughness of the training offered.

Electrical Engineering Students



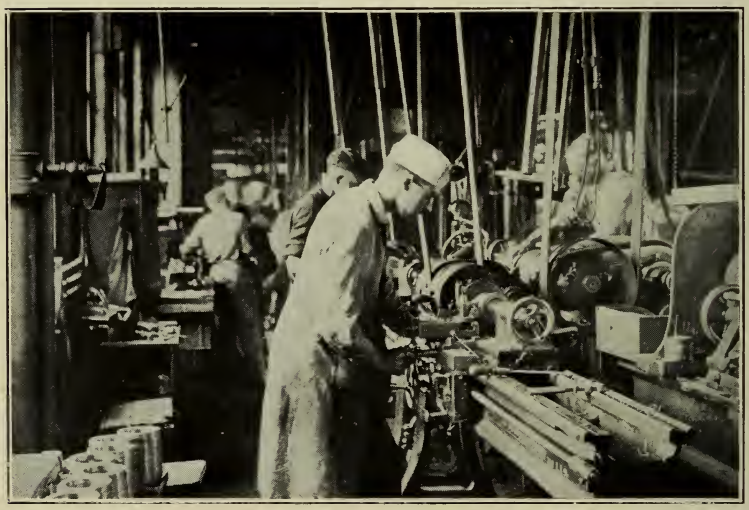
Assembling Gauges
American Steam Gauge & Valve Co.



Operating a Spot Welder
United Shoe Machinery Company—Beverly

Mechanical Engineering Students

Finishing Gauges
F. B. Sanborn Company



Finishing Castings
Blanchard Machine Company—Cambridge

COURSES OF STUDY

General Statement

The schedules of the various courses are given on the following pages. The first year, it will be observed, is practically the same in all courses. A few exceptions are made in courses where students need some special elementary training in their professional subjects, in order that they may be of more use to their employers in their Engineering Practice.

The school year comprises twenty-three weeks of class work for each division. The twenty-three weeks are divided into two terms of ten weeks each, called the Fall Term and Spring Term, and a Summer Term of three weeks. In the schedule which follows each course is followed by two numbers: the first number, under the column marked "Ex," indicates the number of hours of "exercise" in recitation, laboratory, drawing room, or field work per week; the second number, under the column marked "Prep," indicates the number of hours of outside "preparation" that have been assigned as the minimum weekly requirement for each subject. The work is so planned that the student will be required to spend from forty-eight to fifty-two hours per school week in preparation and class work. The number preceding each subject in the schedule is the number by which that subject is identified in the descriptive matter under "Subjects of Instruction."

CIVIL ENGINEERING

The Civil Engineering Course is designed to give the student a broad education in those subjects which form the basis of all branches of technical education, and a special training in those subjects comprised under the term "Civil Engineering." The student receives a sound training, both theoretical and practical, in the sciences upon which professional practice is based.

Civil Engineering covers such a broad field that no one can become expert in its whole extent. It includes topographical engineering, municipal engineering, railroad engineering, structural engineering, and hydraulic and sanitary engineering. It covers land surveying, the building of railroads, harbors, docks and similar structures; the construction of sewers, waterworks, roads, and streets; the design and construction of girders, roofs, trusses, bridges, buildings, walls, foundations, and all fixed structures. All of these branches of engineering rest, however, upon a relatively compact body of principles, and in these principles the students are trained by practice in the class room, drawing room, the field, and the testing laboratory.

The course is designed to prepare the young engineer to take up the work of the design and construction of structures, to aid in the location and construction of steam and electric railways, and to undertake intelligently supervision of work in the allied fields of mining, architectural, and electrical engineering, and general contracting.

I. CIVIL ENGINEERING

FIRST YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
010-1 English	2	4	010-1 English	2	4
020-1 College Algebra	3	6	022-1 Analytic Geometry	4	6
021-1 Trigonometry	4	6	030-1 Physics Laboratory	2	2
030-1 Physics Laboratory	2	2	031-1 Physics	4	8
041-1 Mechanical Drawing	5	0	041-2 Mechanical Drawing	4	0
11-1 Surveying	2	4	11-1 Surveying	2	4
11-2 Surveying, F. & P.	5	0	11-2 Surveying F. & P.	5	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0
043-1 *Descriptive Geometry	20	10			
061-1 *Economics and Sociology.	5	10			
90-1 *Physical Training	2	0			

SECOND YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
023-1 Calculus	4	6	023-2 Calculus	3	6
031-2 Physics Laboratory	2	2	032-2 Physics Laboratory	2	2
032-1 Light	3	3	032-3 Heat	3	4
042-1 Machine Drawing	3	0	042-2 Machine Drawing	3	0
11-3 Surveying	2	4	12-1 Railroad Surveying	3	4½
11-4 Surveying F. & P.	5	0	12-2 Rrd. Surveying F. & P.	5	0
21-1 Applied Mechanics	3	6	21-1 Applied Mechanics	3	4½
30-1 Elements of Electricity	2	2	30-1 Elements of Electricity	2	2
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0
044-1 *Mechanism	15	10			
062-1 *Government	5	10			
90-1 *Physical Training	2	0			

THIRD YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
051-1 Geology	2	2	14-1 Theory of Structures	3	6
12-3 Railroad Engineering	2	4	14-2 Structural Drawing	3	3
12-4 Rrd. Engineering F. & P.	5	0	21-2 Strength of Materials	3	6
21-2 Strength of Materials	3	6	23-3 Heat Engineering	3	6
30-3 Applied Electricity	2	4	30-3 Applied Electricity	2	4
30-4 Applied Elec. Lab.	3	3	30-4 Applied Elec. Lab.	3	3
40-1 Inorganic Chemistry	4	4	50-1 Engineering Conference	1	0
50-1 Engineering Conference	1	0	90-1 Physical Training	2	0
90-1 Physical Training	2	0			
063-1 *History of Science	5	10			
13-1 *Hydraulics	10	20			
90-1 *Physical Training	2	0			

FOURTH YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
14-3 Engineering Structures	6	12	14-3 Engineering Structures	6	12
14-4 Structural Design	6	0	14-4 Structural Design	6	0
15-1 Concrete	2	4	15-1 Concrete	2	4
15-2 Concrete Design	3	0	15-2 Concrete Design	3	0
16-1 Materials	2	4	16-2 Testing Material Lab.	2	2
16-3 Foundations	2	2	17-1 Highway Engineering	2	2
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
51-1 Thesis	1	3	51-1 Thesis	1	6
90-1 Physical Training	2	0	90-1 Physical Training	2	0

*Summer Term: Three weeks.

MECHANICAL ENGINEERING

The Mechanical Engineering course is designed to give the student a broad foundation in those fundamental subjects which form the basis for all professional engineering practice, and especially to equip the young engineer with a knowledge of the various phases of Mechanical Engineering. The course embraces instruction by text-book, lecture, laboratory, and work-shop practice, with special reference to the following branches: applied mechanics, heat engineering, industrial engineering, hydraulic engineering, applied electricity, and machine design.

The instruction aims to develop in the student the ability to think clearly and logically in the application of fundamental principles to engineering problems. The class-room work in the professional subjects is arranged with due regard to modern industrial conditions, in order that the student may connect theory with practice and appreciate the necessity of both in order to become a successful engineer. With this in view, special courses are given involving a discussion of problems which have presented themselves to the students and requiring a familiarity with the contents of current engineering periodicals. At all times it is sought to develop self-confidence in the student, and he is encouraged to take the initiative.

II. MECHANICAL ENGINEERING

FIRST YEAR

FALL TERM	Hours per week Ex.	Prep.
010-1 English	2	4
020-1 College Algebra	3	6
021-1 Trigonometry	4	6
030-1 Physics Laboratory	2	2
041-1 Mechanical Drawing	5	0
24-1 Production Engineering	2	3
40-1 Inorganic Chemistry	4	4
90-1 Physical Training	2	0

SPRING TERM	Hours per week Ex.	Prep.
010-1 English	2	4
022-1 Analytic Geometry	4	6
030-1 Physics Laboratory	2	2
031-1 Physics	4	8
041-3 Mechanical Drawing	9	0
24-2 Production Engineering	2	3
90-1 Physical Training	2	0

043-1 *Descriptive Geometry	20	10
061-1 *Economics and Sociology	5	10
90-1 *Physical Training	2	0

SECOND YEAR

FALL TERM	Hours per week Ex.	Prep.
023-1 Calculus	4	6
031-2 Physics Laboratory	2	2
032-1 Light	3	3
042-3 Machine Drawing	6	0
044-2 Mechanism	4	4
21-1 Applied Mechanics	3	6
30-1 Elements of Electricity	2	2
50-1 Engineering Conference	1	0
90-1 Physical Training	2	0

SPRING TERM	Hours per week Ex.	Prep.
023-2 Calculus	3	6
032-2 Physics Laboratory	2	2
032-3 Heat	3	4
033-1 Precision of Measurements	1	1
044-3 Mechanism	6	6
21-1 Applied Mechanics	3	4½
30-1 Elements of Electricity	2	2
50-1 Engineering Conference	1	0
90-1 Physical Training	2	0

042-4 *Machine Drawing	30	0
062-1 *Government	5	10
90-1 *Physical Training	2	0

THIRD YEAR

FALL TERM	Hours per week Ex.	Prep.
051-1 Geology	2	2
21-2 Strength of Materials	3	6
22-1 Graphical Analysis	6	2
23-1 Heat Engineering	3	6
24-3 Power Plant Equipment	2	4
30-3 Applied Electricity	2	4
30-4 Applied Elec. Lab.	3	3
50-1 Engineering Conference	1	0
90-1 Physical Training	2	0

SPRING TERM	Hours per week Ex.	Prep.
16-1 Materials	2	4
21-2 Strength of Materials	3	6
22-2 Elem. Machine Design	6	2
23-1 Heat Engineering	3	6
30-3 Applied Electricity	2	4
30-4 Applied Elec. Lab.	3	3
50-1 Engineering Conference	1	0
90-1 Physical Training	2	0

063-1 *History of Science	5	10
11-5 *Surveying	5	0
13-1 *Hydraulics	10	20
90-1 *Physical Training	2	0

FOURTH YEAR

FALL TERM	Hours per week Ex.	Prep.
13-2 Hydraulic Motors	2	4
15-1 Concrete	2	4
15-2 Concrete Design	3	0
22-3 Machine Design	6	2
23-2 Engineering Laboratory	2	2
23-5 Heat Engineering	2	4
24-4 Journals and Reports	1	3
25-1 Industrial Plants	3	5
50-1 Engineering Conference	1	0
51-1 Thesis	1	3
90-1 Physical Training	2	0

SPRING TERM	Hours per week Ex.	Prep.
15-1 Concrete	2	4
15-2 Concrete Design	3	0
22-3 Machine Design	6	4
24-5 Journals and Reports	1	3
24-6 St'd. Eng. Prod. and Proc.	2	4
25-1 Industrial Plants	4	4
50-1 Engineering Conference	1	0
51-1 Thesis	1	8
90-1 Physical Training	2	0

*Summer Term: Three weeks.

ELECTRICAL ENGINEERING

Probably none of the branches of scientific knowledge has been so markedly modified during the past decade as that relating to Electricity, nor has any other exerted such a profound influence upon the scientific thought of the period. A science, like a planet, grows in the main by a process of infinitesimal accretion. Its theory is built like a cathedral through the addition by many builders of many different elements, and this is pre-eminently true of Electricity. It is absolutely essential that the electrical engineer who hopes to make a success of his work should be able to grasp readily and absorb effectively the meaning and content of the many scientific memoirs recording the results of research bearing upon and directly influencing his chosen branch of engineering.

He must have a thorough appreciation of physical theory, a clear understanding of chemical principles, and a broad working knowledge of mathematics. It is essential that each student planning to take this course should realize the fundamental necessity of obtaining a solid grounding in these three subjects upon which the success of his future work will definitely hinge, nor can he be too strongly urged to include physics in his high school preparatory course if he hopes to avoid difficulty in the earlier years.

It is not the purpose of the course to attempt the impossible in aiming to turn out electrical engineers, fully trained in all the branches of the science, especially as it is becoming daily more differentiated and specialized. The course is designed rather to lay a broad and secure foundation for future progress along the lines of activity which may particularly appeal to each individual student and give him a good working knowledge of the essential principles which underlie each of the more specialized branches of professional work.

Parallel with the theoretical work, runs a carefully planned course of laboratory instruction which is intended to develop the student's power of accurate observation, of planning work and methods of procedure for himself with due regard to saving of time and labor and precision of the results attained.

III. ELECTRIAL ENGINEERING

FIRST YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
010-1 English	2	4	010-1 English	2	4
020-1 College Algebra	3	6	022-1 Analytic Geometry	4	6
021-1 Trigonometry	4	6	030-1 Physics Laboratory	2	2
030-1 Physics Laboratory	2	2	031-1 Physics	4	8
041-1 Mechanical Drawing	5	0	041-3 Mechanical Drawing	9	0
31-1 Elem. of Elec. Engineering	2	3	32-1 Electrical Engineering	2	3
40-1 Inorganic Chemistry	4	4	32-2 Elec. Eng. Lab.	3	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0
043-1 *Descriptive Geometry	20	10			
061-1 *Economics and Sociology.	5	10			
90-1 *Physical Training	2	0			

SECOND YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
023-1 Calculus	4	6	023-2 Calculus	3	6
031-2 Physics Laboratory	2	2	032-2 Physics Laboratory	2	2
032-1 Light	3	3	032-3 Heat	3	4
042-3 Machine Drawing	6	0	033-1 Precision of Measurements	1	1
21-1 Applied Mechanics	3	6	21-1 Applied Mechanics	3	4½
32-3 Electrical Engineering	3	5	32-4 Elec. Eng. Lab.	3	3
32-4 Elec. Eng. Lab.	3	3	32-5 Electrical Engineering	4	8
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0
044-1 *Mechanism	15	10			
062-1 *Government	5	10			
90-1 *Physical Training	2	0			

THIRD YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
21-3 Strength of Materials	3	6	16-1 Materials	2	4
23-1 Heat Engineering	3	6	23-1 Heat Engineering	3	6
32-6 Elec. Eng. Lab.	6	3	32-6 Elec. Eng. Lab.	6	3
32-7 Electrical Engineering	4	6	32-7 Electrical Engineering	4	6
33-1 Elec. Measurements	2	3	33-1 Elec. Measurements	2	3
33-2 Elec. Measurements Lab.	3	2	33-2 Elec. Measurements Lab.	3	2
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0
063-1 *History of Science	5	10			
11-5 *Surveying	5	0			
13-1 *Hydraulics	10	20			
90-1 *Physical Training	2	0			

FOURTH YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
13-2 Hydraulic Motors	2	4	24-6 St'd. Eng. Prod. and Proc.	2	4
23-2 Engineering Laboratory	2	2	32-8 Elec. Eng. Lab.	6	3
32-8 Elec. Eng. Lab.	6	3	32-9 Elec. Engineering	4	8
32-9 Elec. Engineering	4	8	34-1 Elec. Engineering	4	6
34-1 Elec. Engineering	4	6	35-1 Advanced Electricity	2	3
35-1 Advanced Electricity	2	3	50-1 Engineering Conference	1	0
50-1 Engineering Conference	1	0	51-1 Thesis	1	6
51-1 Thesis	1	3	90-1 Physical Training	2	0
90-1 Physical Training	2	0			

*Summer Term: Three weeks.

CHEMICAL ENGINEERING

The efficiency of any industrial chemical enterprise depends not only upon a knowledge of the chemical reactions forming the basis of the process, but also upon a knowledge of the mechanical principles on which depend the design, construction and maintenance of the plant for the carrying on of these reactions. Owing to the keen competition among industries which must follow the abnormal war-time production, it will be necessary to maintain the highest possible efficiency.

The purpose of this course is to prepare students capable of filling the demand for trained men competent to build and operate manufacturing industries based upon chemical principles at their maximum efficiency. The professional work of the course falls naturally into three groups: First, courses which provide a knowledge of the fundamental principles of chemistry. Second, those courses which furnish a knowledge of mechanical engineering subjects. Third, engineering practice in which the student becomes familiar with the many applications of theoretical principles.

The laboratory work has been planned not only to familiarize the student with many types of chemical compounds and apparatus, but also to train the student to be an exact and logical thinker, and to encourage a desire for the application of his knowledge and training to the investigation and solution of the many problems which modern industry presents.

IV. CHEMICAL ENGINEERING

FIRST YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
010-1 English	2	4	010-1 English	2	4
020-1 College Algebra	3	6	022-1 Analytic Geometry	4	6
021-1 Trigonometry	4	6	030-1 Physics Laboratory	2	2
030-1 Physics Laboratory	2	2	031-1 Physics	4	8
041-1 Mechanical Drawing	5	0	041-2 Mechanical Drawing	4	0
41-1 Inorganic Chemistry	4	4	41-1 Inorganic Chemistry	4	4
41-2 Inorganic Chem. Lab.	5	0	41-2 Inorganic Chem. Lab.	5	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0

043-1 *Descriptive Geometry	20	10
061-1 *Economics and Sociology.	5	10
90-1 *Physical Training	2	0

SECOND YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
023-1 Calculus	4	6	023-2 Calculus	3	6
031-2 Physics Laboratory	2	2	032-2 Physics Laboratory	2	2
032-1 Light	3	3	032-3 Heat	3	4
042-1 Machine Drawing	3	0	042-2 Machine Drawing	3	0
21-1 Applied Mechanics	3	6	21-1 Applied Mechanics	3	4½
30-1 Elements of Electricity	2	2	30-1 Elements of Electricity	2	2
42-1 Qualitative Analysis	2	4	42-1 Qualitative Analysis	2	4
42-2 Qualitative Anal. Lab.	5	0	42-2 Qualitative Anal. Lab.	5	0
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0

044-1 *Mechanism	15	10
062-1 *Government	5	10
90-1 *Physical Training	2	0

THIRD YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
21-3 Strength of Materials	3	6	23-3 Heat Engineering	3	6
30-3 Applied Electricity	2	4	30-3 Applied Electricity	2	4
30-4 Applied Elec. Lab.	3	3	30-4 Applied Elec. Lab.	3	3
43-1 Quantitative Analysis	2	4	44-1 Technical Analysis	2	4
43-2 Quantitative Anal. Lab.	5	0	44-2 Technical Anal. Lab.	5	0
45-1 Organic Chemistry	3	6	45-1 Organic Chemistry	3	6
45-2 Organic Chem. Lab.	5	0	45-2 Organic Chem. Lab.	5	0
50-1 Engineering Conference	1	0	50-1 Engineering Conference	1	0
90-1 Physical Training	2	0	90-1 Physical Training	2	0

063-1 *History of Science	5	10
13-1 *Hydraulics	10	20
90-1 *Physical Training	2	0

FOURTH YEAR

FALL TERM	Hours per week Ex.	Prep.	SPRING TERM	Hours per week Ex.	Prep.
45-3 Organic Chemistry	2	4	45-3 Organic Chemistry	2	4
45-4 Organic Chem. Lab.	5	0	45-4 Organic Chem. Lab.	5	0
46-1 Chemical Engineering	3	6	46-1 Chemical Engineering	3	6
47-1 Industrial Chemistry	3	3	47-1 Industrial Chemistry	3	3
47-2 Industrial Chem. Lab.	8	0	48-1 Physical Chemistry	4	8
48-1 Physical Chemistry	4	8	50-1 Engineering Conference	1	0
50-1 Engineering Conference	1	0	51-1 Thesis	1	10
90-1 Physical Training	2	0	90-1 Physical Training	2	0

*Summer Term: Three weeks.

SUBJECTS OF INSTRUCTION

Instruction is given by lectures and recitations, and by practical exercises in the field, in the laboratories, and in the drawing rooms. A great value is set upon the educational effect of these exercises, and they form the foundation of each of the four courses. In many branches the instruction given differs widely from available texts in which cases notes on the lectures and laboratory work are usually issued to the students. Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time.

In the following pages will be found a more or less detailed statement of the scope of the subjects offered in the various courses. The subjects are classified, as far as possible, related studies being arranged in sequence. The subjects are numbered for convenience in consulting the various Course Schedules. A complete table of the Subjects of Instruction will be found at the end of the book. Under each subject is given a list of the subjects required as preparation for that subject. These requirements are made as it is felt that the student must have become proficient in all these subjects for a clear comprehension of the advanced work. In some cases, the required preparation may be taken simultaneously and must be completed before further advanced work is undertaken.

Students electing any subject must complete that subject in order to be a candidate for a degree.

By careful consideration of the Course Schedules, in connection with the following Synopsis of Courses, the applicant for a special course may select, for the earlier part of that course, such subjects as will enable him to pursue later those more advanced subjects which he may particularly desire. Applications for exception from the required preparation as stated in connection with each subject described below, will be passed on by the Faculty.

The topics included in the list which follows are subject to change at any time by action of the School authorities.

SYNOPSIS OF COURSES

In the following synopsis under each subject, "Courses" refers to the four principal courses of Civil I, Mechanical II, Electrical III, and Chemical IV, in which that particular subject is required. The subjects themselves are arranged in groups according to the departments under which the subject falls. The "year and term" refer to the time when the subject is ordinarily taken under the regular schedule, "both terms" referring to both the Fall and Spring terms and "Summer Term" referring to the three week term given after the close of the Spring term for Division A and before the Fall term for Division B. "Preparation" gives the subjects by number that the student must have taken and passed satisfactorily before he may be permitted to take the subject under discussion, except in a few stated cases where the preparation may be taken simultaneously. The number of "hours per week" refers to the hours of class room or laboratory work and does not include the hours of outside preparation. The main body of the synopsis shows in a brief form the ground covered by the course. At the end of the synopsis is given the names of the instructors for that particular subject; the first named being in charge.

010-1 ENGLISH

Courses: I, II, III, IV — *Preparation: ——*
First year, both terms — *Two hours per week*

English Composition: An elementary course especially adapted to the needs of men who expect to follow the engineering profession. Watt's "The Composition of Technical Papers" forms the basis of the course. The work consists of lectures, recitations, class discussions, weekly themes, tests, reports, and a limited amount of outside reading, particularly in modern scientific journals. The material for the themes is entirely drawn from, or related to, the student's study in the laboratory and experience in his Engineering Practice with the co-operating firm.

MR. MELVIN

020-1 COLLEGE ALGEBRA

Courses: I, II, III, IV — *Preparation: ——*
First year, fall term — *Three hours per week*

Beginning with quadratic equations, the student has an opportunity to review the various operations of simpler algebra. The course also includes a study of the theory of exponents, series, determinants, principles of theory of equations, graphs, permutations and combinations, and principles of vector analysis.

021-1 TRIGONOMETRY

First year, fall term — *Preparation: ——*
Courses: I, II, III, IV — *Four hours per week*

Trigonometric functions as ratios; transformation and solution of trigonometric equations; inverse functions; circular functions; goniometry; logarithms; solution of exponential equations; solution of right and oblique triangles; law of sines, cosines, and tangents; areas. Considerable practice in calculation of practical problems enables the student to apply his trigonometry to problems arising in Engineering Practice at an early stage. Explanation of laws of spherical trigonometry.

PROFESSORS SPEAR AND PUGSLEY.

022-1 ANALYTIC GEOMETRY

Courses: I, II, III, IV — *Preparation: 020-1, 021-1*
First year, spring term — *Four hours per week*

Cartesian and polar co-ordinates. The equations of straight lines and simpler curves derived from the geometric properties of the curves. Properties of curves derived from their equations. Thorough study of straight line, circle, and conic sections. Intersection of curves, transformation of axes. Plotting of polynomials including exponential, trigonometric, and logarithmic functions. Loci problems. An endeavor is made to develop the analytic sense in the student throughout the course, rather than to rely on the use of formulae.

PROFESSOR SPEAR,
MR. PORTER.

023-1 DIFFERENTIAL CALCULUS

Courses: I, II, III, IV — *Preparation: 022-1*
Second year, fall term — *Four hours per week*

Theory of limits; rates of change; differentiation of algebraic, trigonometric, exponential, and logarithmic functions; slopes of curves; maxima and minima, with practical problems; partial differentiation; derivatives of higher order; lengths of curves; radius of curvature, etc.; expansion of functions, series.

Although the subject matter of the course deals with considerable theory, constant sight is kept of the practical application of all the theory. The geometric interpretation of every new subject is carefully defined, and problems are continually solved dealing in practical applications of theory. Velocity and acceleration problems in mechanics are typical of those used for application of differentiation.

PROFESSOR SPEAR.

023-2 INTEGRAL CALCULUS

Courses: I, II, III, IV — *Preparation: 023-1*
Second year, spring term — *Three hours per week*

A continuation of Course 023-1. Integration as the inverse of differentiation; intergration as a summation; definite integrals; use of tables; double and triple integrals; areas in rectangular and polar co-ordinates; volumes; center of gravity; moment of inertia. Practical problems depending on the differential and integral calculus for solution. Solution of simpler differential equations.

PROFESSOR SPEAR.

030-1 PHYSICS LABORATORY

Courses: I, II, III, IV — *Preparation: ——*
First year, both terms — *Two hours per week*

A series of twenty-five experiments of an elementary grade for those students who are found to be deficient in the simpler fundamentals of Physics. This course gives the students a thorough preparation for their work in Courses 031-2 and 032-2.

MR. GIRARD.

031-1 PHYSICS

Courses: I, II, III, IV — *Preparation: 021-1*
First year, spring term — *Four hours per week*

A study of the principles of mechanics, statics and dynamics. The subjects studied are: Equilibrium of bodies acted upon by parallel forces, equilibrium of bodies acted upon by concurrent forces, vectors, relative velocities, uniform velocity, uniformly accelerated motion, projectiles, simple harmonic motion, motion on an inclined plane, energy, work, horse-power, angular velocity and acceleration, moment of inertia, kinetic energy of rotation, centrifugal force, fluid pressure, density and specific gravity of solids and liquids, Boyles law, and hydrometers. It is the purpose of the course to lay a thorough foundation for subsequent study of experimental and technical physics. Hence it is planned with immediate reference to familiarize the pupil with the fundamental principles of the science.

PROFESSOR COOLIDGE,
MR. STEARNS.

031-2 PHYSICS LABORATORY

Courses: I, II, III, IV — *Preparation: 030-1, 031-1*
Second year, fall term — *Two hours per week*

Experiments on Mechanics performed by each student, supplementing the lecture and class room work n Physics 031-1. The experiments include the use of verniers, micrometers, and spherometers, calculation of true weights, determination of specific gravities of solids by various methods, areas by planimeter, modulus of elasticity, and motion on an inclined plane.

MR. GIRARD.

032-1 LIGHT

Courses: I, II, III, IV — *Preparation: 031-1*
Second year, fall term — *Two hours per week*

The study of Light, including wave motion, mirrors, refraction, lenses, optical instruments, dispersion, interference, diffraction, and polarization of light.

PROFESSOR COOLIDGE.

032-2 PHYSICS LABORATORY

Courses: I, II, III, IV — *Preparation: 032-1, 032-3 taken concurrently*

Second year, spring term — *Two hours per week*

A series of experiments on Light and Heat to supplement the work done in Physics 032-1 and Physics 032-3. The experiments on Light include the determination of the index of refraction of a lens, the position of images in combinations of lenses, and the uses of the spectrometer and spectroscope. The experiments on Heat include the calibration of a thermometer, determination of the temperature of a mixture, the relations between the pressure and boiling point of water, and the use of the air thermometer.

MR. GIRARD.

032-3 HEAT

Courses: I, II, III, IV — *Preparation: 031-1*

Second year, spring term — *Two hours per week*

The topics studied are: thermometry, expansion of solids, liquids and gases, calorimetry, change of state including latent heat of fusion and vaporization (sublimation), triple point diagram, conduction and radiation, and the mechanical equivalent of heat.

PROFESSOR COOLIDGE.

033-1 PRECISION OF MEASUREMENTS

Courses: II, III — *Preparation: 023-1*

Second year, spring term — *One hour per week*

A thorough discussion of the fundamentals of the Theory of Measurements, including a study of the Sources of Error, the Best Representative Value of the result of a series of measurements, the determination of the several Precision Measures of the result of one's work; the converse problem of how best to proceed in order to reach a given degree of precision, and a thorough consideration of the proper use of Significant Figures.

PROFESSOR SMITH.

041-1 MECHANICAL DRAWING

Courses: I, II, III, IV — *Preparation: ——*
First year, fall term — *Five hours per week*

An elementary course in the fundamentals of mechanical drawing, embracing exercises in the proper use and care of drafting tools, a thorough study of the principles of orthographic projection with special attention to their application to engineering drawing, lettering, dimensioning, and tracing. The work is planned on the assumption that the student understands simple geometrical constructions as studied in plane geometry.

PROFESSORS ASHLEY AND GEE.

041-2 MECHANICAL DRAWING

Courses: I, IV — *Preparation: 041-1*
First year, spring term — *Four hours per week*

A continuation of Course 041-1, comprising problems in the development of solids, examples in isometric drawing, and perspective.

PROFESSORS ASHLEY AND GEE.

041-3 MECHANICAL DRAWING

Courses: II, III — *Preparation: 041-1*
First year, spring term — *Nine hours per week*

A continuation of Course 041-1, comprising problems in the development of solids, examples in isometric drawing, perspective, screw threads, bolts and nuts, and simple machine parts.

PROFESSORS ASHLEY AND GEE.

042-1 MACHINE DRAWING

Courses: I, IV — *Preparation: 041-2*
Second year, fall term — *Three hours per week*

An elementary machine drawing course comprising a thorough study of screws, bolts and nuts, drafting conventions, and sections.

PROFESSORS ASHLEY AND GEE.

Civil Engineering Students

Giving Lines and Grades for Concrete Construction
Turner Construction Company

Making a Stadia Survey
Class in Surveying Fieldwork

Chemical Engineering Students

Calorimeter Testing
Industrial Engineering Corporation

Class in Quantitative Analysis
Chemical Laboratory

042-2 MACHINE DRAWING

Courses: I, IV — *Preparation: 042-1*
Second year, spring term — *Three hours per week*

Detailing and assembling of simple machines from sketches and drawings.

PROFESSORS ASHLEY AND GEE.

042-3 MACHINE DRAWING

Courses: II, III — *Preparation: 041-3*
Second year, fall term — *Six hours per week*

Reading and translating drawings. Detailed and assembly drawings of machine parts and simple machines are made from freehand sketches and other data, but nothing in the nature of a copy is permitted. The course is designed to give a thorough foundation for the study of machine design.

PROFESSORS ASHLEY AND GEE.

042-4 MACHINE DRAWING

Course: II — *Preparation: 042-3*
Second year, summer term — *Thirty hours per week*

The work here is conducted according to the methods of progressive draftsmen, great emphasis being laid on completeness and accuracy in the use of drawing as a language. A complete machine, such as a lathe, automobile engine, or a simple steam engine is studied by making freehand detail sketches from the individual pieces and afterward mechanically drawing the details from the freehand sketches, and the assembly drawing from the finished details.

PROFESSORS ASHLEY AND GEE.

043-1 DESCRIPTIVE GEOMETRY

Courses: I, II, III, IV — *Preparation: 041-1*
First year, summer term — *Twenty hours per week*

A study of the principles of descriptive geometry and their application to engineering by the solution of many problems in which theory and practice are closely correlated. Classroom exercises are devoted entirely to drafting board problems, preparation for which is obtained by the outside study of textbook references and practice problems.

PROFESSORS ASHLEY AND GEE.

044-1 MECHANISM

Courses: I, III, IV — *Preparation: 041-2 or 041-3*
Second year, summer term — *Fifteen hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, and cams.

PROFESSOR ASHLEY.

044-2 MECHANISM

Course: II — *Preparation: 041-3*
Second year, fall term — *Four hours per week*

An introductory course conducted mainly by graphical methods and dealing with gear trains, velocity ratios, paths of mechanical movements and their application to velocity diagrams, quick-return mechanisms, and cams. The first part of the course is identical with Course 044-1.

PROFESSOR ASHLEY.

044-3 MECHANISM

Course: II — *Preparation: 044-2*
Second year, spring term — *Six hours per week*

A continuation of Course 044-2, embracing the careful study of gear-tooth outlines, and an introduction to the subject of valve gear diagrams.

PROFESSOR ASHLEY.

051-1 GEOLOGY

Courses: I, II — *Preparation: ——*
Third year, fall term — *Two hours per week*

Earth movements and the various terrestrial applications of solar energy. The more important geological processes, erosion, sedimentation, deformation, and eruption are taken up and discussed. The latter part of the course is devoted to lectures on the broader structural features of the earth's crust and the application of the principles of structural geology to practical engineering problems.

PROFESSOR PUGSLEY.

061-1 ECONOMICS

Courses: I, II, III, IV — *Preparation: ——*
First year, summer term — *Five hours per week*

A rapid survey of the elementary principles of economics, such as those of wealth, labor, capital, value, price, and so forth. Particular attention is paid to the consideration of money, the mechanism of exchange, banking and its relation to the finances of corporations. In studying the distribution of wealth, considerable attention is paid to the questions of wages and value, and their relation to business profits.

062-1 GOVERNMENT

Courses: I, II, III, IV — *Preparation: ——*
Second year, summer term — *Five hours per week*

The theory and practice of government in the existing forms of national organization in the United States and Great Britain. The relations between the executive, the legislature, and the judiciary will form the basis of investigation. In the lectures additional illustrative material will be taken from France, the former German Empire, and the German Commonwealth. It is hoped that the men will look on the study of government, not as academic but as practical, through constant reference to contemporary men and affairs.

063-1 HISTORY OF SCIENCE

Courses: I, II, III, IV — *Preparation: ——*
Third year, summer term — *Five hours per week*

The aim is to give a broad view of the growth of science, extend the range of the students' interests, and encourage discriminating scientific reading. Considerable collateral reading is required of the students.

PROFESSOR DURKEE.

064-1 GERMAN

Course: IV — *Preparation: ——*
Fourth year, both terms — *Two hours per week*

All students in the Chemical Engineering Course are required to show before graduation a sufficient knowledge of the German language to be able to read technical books and scientific

articles written in the German language. For students who have not obtained this knowledge before entering college, this course will offer a study of grammatical forms, syntax, and vocabulary through composition exercises and rapid reading. The entire purpose is to give the student a knowledge of German grammar with a working vocabulary of scientific terms.

11-1 SURVEYING

Course: I — *Preparation: ——*
First year, both terms — *Two hours per week*

Lectures, recitations, and problem work in which the following subjects are considered: the chain, tape, compass, transit and level, methods of making and computing both closed and random traverses, location of buildings and points, surveying for deeds, city surveying, U. S. system of public land surveying, differential and profile levelling, theory and use of contours and contour maps, computation of earthwork, stadia methods and various special problems.

PROFESSOR NASH.

11-2 SURVEYING, FIELD WORK AND PLOTTING

Course: I — *Preparation: 11-1 taken concurrently*
First year, both terms — *Five hours per week*

Two afternoons per week throughout the year are devoted to preliminary practice with the standard surveying instruments. The work depends upon, and is closely allied to, the theoretical work in Course 11-1. The student first practises chaining and taping, then learns to use the compass for reading magnetic bearings. Next he runs a closed compass and tape traverse. Then follows practice with the transit, level and tape. The last problem in the Fall is a large transit and tape closed traverse. This traverse is balanced, plotted, and completed as a map during the winter. Work is also done on contour maps and problems. In the spring, more work is taken up in differential and profile leveling, locating of contours, transit and stadia methods, and various special problems such as layout of line and grade for a sewer or a building, and cross sectioning a borrow pit.

PROFESSOR ALVORD.

11-3 SURVEYING

Course: I — *Preparation: 11-1, 11-2*
Second year, fall term — *Two hours per week*

The student is taught the theory of plane and geodetic triangulation, the theory of the sextant, the theory of plane table topographical surveying, the adjustments of instruments, and the methods of stellar observation for the determination of azimuth. Surveying problems in review of the elementary work are assigned to make sure that the student has a comprehensive and accurate knowledge of the art.

PROFESSOR ALVORD.

11-4 SURVEYING, FIELD WORK AND PLOTTING

Course: I — *Preparation: 11-3 taken concurrently*
Second year, fall term — *Five hours per week*

The work follows closely and is dependent upon the theoretical work of Course 11-3. Actual practice is given in triangulation, work with the sextant, plane table, field adjustments of transit and level, and an observation on polaris for latitude and azimuth.

PROFESSOR ALVORD.

11-5 SURVEYING

Courses: II, III — *Preparation: 021-1*
Third year, summer term — *Five hours per week*

Surveying field work during the Summer Term is designed to give the students instruction in the essential principles of surveying. It includes practice in the use of the transit and level.

12-1 RAILROAD SURVEYING

Course: I — *Preparation: 11-3, 11-4*
Second year, spring term — *Three hours per week*

The course covers the principles and application of simple, compound, reversed, parabolic, and transition curves to railroad and highway location.

Methods of setting stakes for earthwork, the computation of cut and fill, and the use of tables and diagrams in solving the types of problem indicated above are studied in detail.

PROFESSOR ALVORD.

12-2 RAILROAD SURVEYING, FIELD AND PRACTICE

Course: I — *Preparation: 12-1 taken concurrently*

Second year, spring term — *Five hours per week*

The work follows closely the theories of course 12-1. It includes the layout in the field of various railroad curves; drafting room problems on location of railroads and highways from existing contour maps; and the reconnaissance and preliminary layout of a line of railroad about a mile long.

PROFESSOR ALVORD.

12-3 RAILROAD ENGINEERING

Course: I — *Preparation: 12-1, 12-2*

Third year, fall term — *Two hours per week*

The work is a continuation of course 12-1. Further study is devoted to the effect of haul and the use of the mass diagram in the determination of the final location. The economics of railroad location are considered, with a study of the effect of maximum grades, rise and fall, traffic, train resistance and tractive power on the design of the final location.

PROFESSOR ALVORD.

12-4 RAILROAD ENGINEERING, FIELD AND PRACTICE

Course: I — *Preparation: 12-3 taken concurrently*

Third year, fall term — *Five hours per week*

Field work in connection with course 12-3. The final location of the railroad line is plotted, including vertical, horizontal, and transition curves. A mass diagram is drawn for the earth work, and final computation of cost is made. Part of the line is slope staked.

PROFESSOR ALVORD.

13-1 HYDRAULICS

Courses: I, II, III, IV — *Preparation: 031-1, 023-2, 21-1*

Third year, summer term — *Ten hours per week*

A study of both hydrostatics and hydrodynamics. The subjects considered are: the pressure on submerged areas together with their points of application; the laws governing the

flow of fluids through orifices, short tubes, nozzles, weirs, pipe lines, and open channels; and the dynamic pressure and work of water flowing over curved surfaces. A short study of stream flow measurements is also made.

13-2 HYDRAULIC MOTORS

Courses: II, III — *Preparation: 13-1*
Fourth year, fall term — *Two hours per week*

Principles underlying the design of hydraulic turbines and motors. A study is also made of stream flow, storage, and other details relating to hydraulic installations.

14-1 THEORY OF STRUCTURES

Course: I — *Preparation: 21-2*
Third year, spring term — *Three hours per week*

Class and drawing-room work in studying the loads, reactions, shears, and moments acting upon structures of various kinds, such as roofs and bridges. A thorough study is also made of the various functions of the influence line; the methods used to determine the position of moving loads to produce maximum shears and moments on bridges; and the design of beams.

PROFESSOR ALVORD.

14-2 STRUCTURAL DRAWING

Course: I — *Preparation: 21-2, 041-1*
Third year, spring term — *Three hours per week*

Drawing of standard sections of structural steel shapes and connections, and the preparation of drawings representing elementary structural details. The course is designed to familiarize the student with the designing and drawing of riveted connections, and the dimensioning and detailing of structural parts.

PROFESSOR NASH.

14-3 ENGINEERING STRUCTURES

Course: I — *Preparation: 14-1, 14-2*

Fourth year, both terms — *Six hours per week*

The computation and design of structures of wood, steel, and masonry by analytical and graphical methods. The subjects considered are: plate girders, roof and bridge trusses of various types; such as simple trusses, bridge trusses with secondary web systems,—including Baltimore and Pettit trusses,—and trusses with multiple web systems, lateral and portal bracing, tranverse bents, viaduct towers, and cantilever bridges. A study is also made of the design of columns, tension members, pin and riveted truss joints, trestles of wood and steel, masonry dams, retaining walls, and arches. The student is also given training in the use of the standard handbooks in structural work. The object is to train the student thoroughly in the application of mechanics to the design of structure.

PROFESSOR NASH.

14-4 STRUCTURAL DESIGN

Course: I — *Preparation: 14-3 taken concurrently*

Fourth year, both terms — *Six hours per week*

Designing and detailing of structures, using the theory learned in Course 14-3. Complete working drawings are ordinarily made of a single track plate girder railroad bridge, a riveted truss highway bridge, and a small concrete arch.

PROFESSOR GEE.

15-1 CONCRETE

Courses: I, II — *Preparation: 21-2*

Fourth year, both terms — *Two hours per week*

Concrete as a material of construction is studied in detail, and the principles of reinforced concrete design are learned. Computations and designs are made of flat slabs, T beams, columns, footings, retaining walls, and arches.

PROFESSOR ALVORD.

15-2 CONCRETE DESIGN

Courses: I, II — *Preparation: 15-1 taken concurrently*

Fourth year, both terms — *Three hours per week*

Detailing and making of complete working drawings of the concrete structures designed in Course 15-1.

PROFESSOR ALVORD.

16-1 MATERIALS

Courses: I, II, III** — *Preparation: 21-2 or 21-3*

Fourth year, fall term — *Two hours per week*

A detailed study is made of the methods of manufacturing, properties, and uses of materials used in engineering work; such as iron and steel, lime, cement, concrete, brick, wood and stone. Methods of testing and strength of various materials used by the engineer are also taken up. Each student is required to prepare, and present to the class, a paper on some subject of especial importance, which is assigned by the instructor.

MR. STEARNS.

*Third year, second term.

16-2 TESTING MATERIALS LABORATORY

Course: I — *Preparation: 21-2*

Fourth year, spring term — *Two hours per week*

The work is done by the students and includes tests to determine the elongation, reduction of areas, modulus of elasticity, yield point, ultimate compressive strength of metals, such as steel, cast iron, copper and brass; tensile and compressive tests on timber and concrete; tests to determine the deflection, modulus of elasticity, elastic limit, and ultimate transverse strength of steel and wooden beams, subject to transverse loads. Tests are also made on cement mortars to determine the strength of cubes and briquettes at different ages.

PROFESSOR ALVORD.

16-3 FOUNDATIONS

Course: I — *Preparation: 14-1, 16-1 taken concurrently*

Fourth year, fall term — *Two hours per week*

The subjects treated are pile formations—including those of timber and concrete—sheet piles, coffer-dams, box and open caissons, pneumatic caissons, pier foundations in open wells, bridge piers, and abutments.

PROFESSOR GEE.

17-1 HIGHWAY ENGINEERING

Course: I — *Preparation: 11-2*

Fourth year, spring term — *Two hours per week*

The location, construction, and maintenance of roads, street design, and street drainage; sidewalks; pavement foundations; and the construction, cost and maintenance of the various kinds of roads and pavements, including asphalt, brick, stone-block, wood-block, macadam (both water bound and bituminous), bituminous concrete, hydraulic cement concrete, gravel, and earth. Special consideration is given to the modern concrete road.

PROFESSOR GEE.

21-1 APPLIED MECHANICS

Courses: I, II, III, IV — *Preparation: 022-1, 031-1*

Second year, both terms — *Three hours per week*

The topics covered are: statics, forces in equilibrium, parallel forces, stresses in frames, forces in three dimensions, center of gravity, moment of inertia, radius of gyration; kinetics, centrifugal force, translation and rotation combined, percussion, friction of belting. The student is required to solve a large number of problems, and to pass examinations at frequent intervals. It is felt that the student should retain a considerable body of facts about this subject in his mind after graduation; therefore a thorough groundwork of theory is covered.

PROFESSOR BENEDICT.

21-2 STRENGTH OF MATERIALS

Courses: I, II — *Preparation: 023-2, 21-1*
Third year, both terms — *Three hours per week*

The topics covered are: the theory and experimental basis of tension, compression, shear, resilience, modulus of elasticity, bending stresses, the design of beams, moment and shear diagrams, use of tables of standard steel shapes, longitudinal shear and deflection in beams, combined stresses, beams with three supports, columns, the strength of shafts and springs, and principal stresses. The basis of the course is a continuous series of practical problems.

PROFESSOR BENEDICT.

21-3 STRENGTH OF MATERIALS

Courses: III, IV — *Preparation: 023-2, 21-1*
Third year, fall term — *Three hours per week*

Similar to course 21-2 but more limited in time. The topics omitted are columns, principal stresses, and longitudinal shear and deflection in beams.

PROFESSOR BENEDICT.

22-1 GRAPHICAL ANALYSIS

Course: II — *Preparation: 042-4, 044-3, 21-1*
Third year, fall term — *Six hours per week*

Many problems which may readily be solved by graphical methods are included here. Valve gear problems are solved by the use of the various diagrams. The kinematical features of various machines are studied by means of velocity and acceleration diagrams.

MR. FERRETTI.

22-2 ELEMENTARY MACHINE DESIGN

Course: II — *Preparation: 21-2 taken concurrently*
Third year, spring term — *Six hours per week*

Simple problems in design embodying the principles studied in the courses in Mechanism 044-2, 044-3, and Strength of Materials, 21-2. The earlier problems are concerned with de-

signs to obtain desired motions, together with the use of some of the simpler machine details such as bolts, keys, pins, etc., while the later problems involve the calculation of simple stresses and the design for strength.

MR. FERRETTI.

22-3 MACHINE DESIGN

Course: II — *Preparation: 22-2*
Fourth year, both terms — *Six hours per week*

Practice is given the student in the application of theoretical principles previously studied, and at the same time he becomes familiar with the many practical details which must be considered in design work. The problems taken up in the early part of the course are of a static nature, while the later problems involve dynamical stresses. The design of some type of pressure vessel, such as a tank or a boiler, constitutes the first problem, the stresses for such a design being known with a great degree of certainty, and the materials of construction very reliable. The other problems of the course vary from year to year, but the following are typical of the designs taken up: arbor press, hydraulic flanging clamp, crane, air compressor, punch and shear, stone-crusher, etc.

In each design the constructive details are carefully considered, with special attention to methods of manufacture, provision for wear, lubrication, etc. The work is based on rational rather than empirical methods, the student being required to make all calculations for determining the sizes of the various parts and all necessary working drawings

MR. FERRETTI.

23-1 HEAT ENGINEERING

Courses: II, III — *Preparation: 023-2,*
Third year, both terms — *Three hours per week*

The fundamental principles underlying the subject of thermodynamics. A study is made of the following topics: the properties of perfect gases, saturated and super-heated vapors, air and steam cycles, and the flow of fluids through nozzles, and pipe-lines, and the calculations of an air compressor.

In the second half-year the principles of thermodynamics are applied to the various parts of the modern steam power plant. This includes a study of boilers, fuels and combustion, flue gas analysis, feed-water heaters, chimneys, steam engines, condensers, cooling towers, gas power, steam turbines, and also the methods of testing power plant equipment.

MR. FERRETTI.

23-2 ENGINEERING LABORATORY

Courses: II, III — *Preparation: 13-1, 23-1*
Fourth year, fall term — *Two hours per week*

Exercises and tests upon the various forms of appliances in use in the power plant, such as:

1. Gauge test and calibration.
2. Slide valve setting.
3. Corliss valve setting.
4. Testing quality of steam by steam calorimeter.
5. Determine flow of steam through an orifice.
6. Steam engine indicator practice.
7. Test of a simple steam engine.
8. Test of a compound steam engine.
9. Study of a steam driven air compressor.
10. Test of a steam driven air compressor.
11. Series of tests on a Pelton water wheel.

MESSRS. EAMES AND STEARNS.

23-3 HEAT ENGINEERING

Courses: I, IV — *Preparation: 023-2, 032-3, 21-1*
Third year, spring term — *Three hours per week*

The subject matter of thermodynamics is presented to the students of civil and chemical engineering to meet their especial needs.

MR. FERRETTI.

23-5 HEAT ENGINERING

Course: II — *Preparation: 23-1, 24-3*

Fourth year, fall term — *Two hours per week*

A continuation of Course 23-1. Among the subjects considered are the compression and absorption systems of refrigeration, Hirn's analysis of steam engine losses, and the theory of vapor mixtures.

MR. FERRETTI.

24-1 PRODUCTION ENGINEERING

Course: II — *Preparation: ——*

First year, fall term — *Two hours per week*

A descriptive course intended to acquaint the student with the organization, methods, and equipment used in industrial plants engaged in quantity production. For purposes of discussion the plant is divided into its various units: such as general offices, drafting-room, pattern-shop, foundry, machine-shop, erecting shop, testing-room, etc. The mechanical equipment, filing systems, cost-keeping systems, "follow-up" cards, etc., are described, and representative examples are shown.

PROFESSOR SWETT.

24-2 PRODUCTION ENGINEERING

Course: II — *Preparation: 24-1*

First year, spring term — *Two hours per week*

A continuation of course 24-1.

PROFESSOR SWETT.

24-3 POWER PLANT EQUIPMENT

Course: II — *Preparation: 23-1 taken concurrently*

Third year, fall term — *Two hours per week*

Largely a description of the many appliances used in modern power plants. A discussion of boilers and boiler accessories, ash and coal handling systems, the various types of engines—gas engines, and turbines—with their valve gears and governing devices, condensers, feed-water heaters, pumps, etc.

MR. STEARNS.

24-4 JOURNALS AND REPORTS

Course: II — *Preparation: 22-2, 23-1*
Fourth year, fall term — *One hour per week*

Designed to acquaint the student with general engineering literature and to enable him to read intelligently discussions upon Mechanical Engineering Practice. The student has three hours of collateral reading per week in standard engineering publications, and the material gathered is discussed in class.

MR. STEARNS.

24-5 JOURNALS AND REPORTS

Course: II — *Preparation: 22-2, 23-1*
Fourth year, spring term — *One hour per week*

Reading and discussion as in Course 24-4, but distinct from it.

MR. STEARNS.

24-6 STANDARD ENGINEERING PRODUCTS AND PROCESSES

Courses: II, III — *Preparation: 16-1*
Fourth year, spring term — *Two hours per week*

Intended to familiarize the student with the commercial names and sizes of engineering products: such as, bar and plate stock, shafting, tubing, pipes, valves, bearings and hangers, belts, pulleys, etc. A discussion of such manufacturing processes as extrusion, broaching, press work, electric and oxy-acetylene welding, cold and hot rolling and drawing, etc., is included.

PROFESSOR SWETT.

25-1 INDUSTRIAL PLANTS

Course: II — *Preparation: 21-2, 23-1, 24-3*
Fourth year, fall term — *Three hours per week*
spring term — *Four hours per week*

The principles involved in the erection, installation, and management of an industrial plant. A description of the different types of structures, with consideration of such details

as foundations, walls, columns, floors, windows, etc., is followed by a discussion of the installation of the power plant and machinery. Principles of illumination, fire-prevention, heating and ventilation, routing of materials, and the organization and management of a plant are taken up. A design problem is given in connection with the course.

MR. STEARNS.

30-1 ELEMENTS OF ELECTRICITY

Courses: I, II, IV — *Preparation: 022-1, 031-1*
Second year, both terms — *Two hours per week*

The foundation for subsequent electrical engineering work for students of Civil, Mechanical, and Chemical Engineering. Emphasis is laid on the fundamental principles, and the subject is developed by elaborating these principles through numerical applications. The topics discussed are, briefly: magnets and magnetism, electrical resistance and Ohm's law, electric work and power, series and parallel circuits, electromagnetism, electromagnetic induction, magnetic properties of iron, electrolysis and batteries, alternating currents and voltages, inductance, capacitance, and circuits containing resistance, inductance, and capacitance.

PROFESSOR DURKEE.

30-3 APPLIED ELECTRICITY

Courses: I, II, IV — *Preparation: 30-1*
Third year, both terms — *Two hours per week*

The object is to fit the student to handle intelligently electrical problems that are likely to come up in connection with his chosen field. The course varies somewhat in content, depending upon the particular branch of engineering which most of the students in the class are studying. In any case, the first term is devoted to a consideration of various direct-current machines and appliances; their characteristics and applications. In the second term alternating-current apparatus is treated in a similar manner.

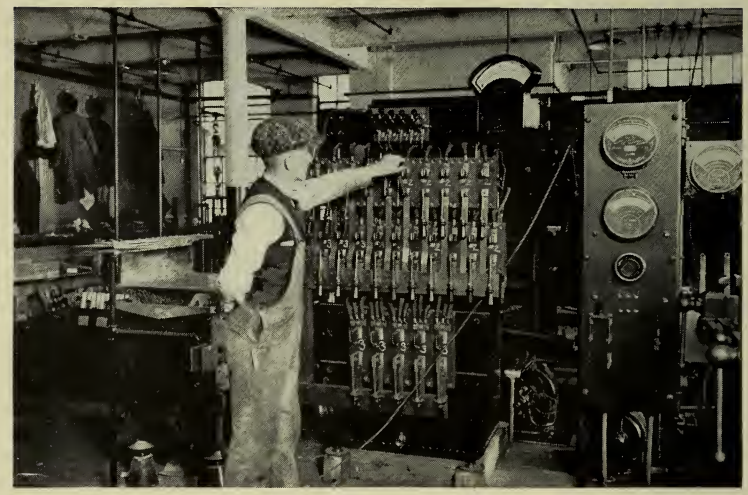
PROFESSOR DURKEE.

Civil Engineering Students

Making a Plane Table Survey
Class in Surveying Fieldwork

Class in Surveying Fieldwork
Northeastern College

Electrical Engineering Students



Testing a 10,000 Ampere Storage Battery Control Panel
Condit Electrical Mfg. Co.

Assembling Vacuum Tubes
L. E. Knott Apparatus Company

30-4 APPLIED ELECTRICITY LABORATORY

Courses: I, II, IV — *Preparation: 30-3 taken concurrently*

Third year, both terms — *Three hours per week*

The characteristics and operation of direct and alternating current machinery, discussed in Course 30-3. The experiments deal with the following: resistance measurement, speed control direct-current motors; voltage control of generators; voltage regulation of direct-current generators; speed regulation of direct-current motors; brake tests of various types of direct and alternating-current motors; measurement of losses and the calculating of the efficiency of motors and generators; alternating current circuits containing resistance, inductance, and capacitance; determination of the characteristics of transformers; various polyphase connections; regulation of alternators; synchronous motor, rotary converter, and induction motor characteristics. A written report is required on each experiment, and especial care is exercised that such reports be correct in manner and in form.

PROFESSOR DURKEE,
MR. PORTER.

31-1 ELEMENTS OF ELECTRICAL ENGINEERING

Course: III — *Preparation: ——*

First year, fall term — *Two hours per week*

A descriptive discussion of the fundamental principles of electricity, combined with an outline of their application in the art. The principal aim is to familiarize the student as soon as possible with those matters with which it is important he should be acquainted, in order that he may from the beginning obtain the most possible from his Engineering Practice.

PROFESSOR SMITH.

32-1 ELECTRICAL ENGINEERING

Course: III — *Preparation: 31-1, 40-1*

First year, spring term — *Two hours per week*

A study in detail of the electric current, electromotive force and resistance, electrical work and power, electrical circuits, Kirchoff's laws, primary and secondary batteries, magnetism,

electromagnetism, electromagnetic induction, self and mutual inductance, electrostatics, energy stored in the electromagnetic and electrostatic field. The practical units of measurement are discussed, as the several quantities to which they apply are successively reached.

MR. PORTER.

32-2 ELECTRICAL LABORATORY

Course: III — *Preparation: 32-1 taken concurrently*

First year, spring term — *Three hours per week*

Experiments selected and arranged to teach the use of the more common electrical measuring instruments and to illustrate and enforce the principles developed in Course 31-1.

MR. PORTER.

32-3 ELECTRICAL ENGINEERING

Course: III — *Preparation: 022-1, 031-1, 32-1*

Second year, fall term — *Three hours per week*

A careful, though more or less descriptive, discussion of the dynamo in general, and its uses both as generator and motor, together with a thorough discussion of the magnetic properties of iron and the magnetic circuit, and a careful consideration of the single energy transient in inductive circuits, followed by a thorough study of the direct current machine—armature windings, armature reactions and their compensation, commutation, generator and motor ratings.

PROFESSOR SMITH.

32-4 ELECTRICAL LABORATORY

Course: III — *Preparation: 32-3, 32-5 taken concurrently*

Second year, both terms — *Three hours per week*

A carefully selected series of experiments intended to exemplify qualitatively, and in the clearest manner, the principles developed in the parallel lecture courses, 32-3, and 32-5. It includes a series of about twenty experiments, of which the following may be mentioned as illustrative of the type of work:

The starting of a shunt motor, and starting devices.

The speed, field and voltage relations in a separately excited machine.

The heat test of a generator.

The characteristic curves of generators.

The parallel operation of shunt and compound generators.

The three wire balancer set.

The speed and torque curves of the series motor.

Satisfactory completion of fifteen experiments is the minimum acceptable amount of work.

Since the purpose of the course is in part to develop correct methods of work, it is intended that the whole of the preparatory work, as well as the working up of the data obtained, shall be done in the laboratory under supervision of the instructor, so far as necessary.

MR. PORTER.

32-5 ELECTRICAL ENGINEERING

Course: III — *Preparation: 32-3*

Second year, spring term — *Four hours per week*

Divided into two parts: first, a discussion of the uses and operation of the machinery discussed in 32-1, illustrative of which may be mentioned: parallel operation, three wire systems and machines, boosters and balancers, special motor applications and control and similar subjects; second, a study of the methods and principles involved in the testing for efficiency and performance of the machinery studied.

Much emphasis is placed upon the working of problems, a special weekly period being set aside for this, and about one hundred problems are worked in the class-room.

PROFESSOR SMITH.

32-6 ELECTRICAL LABORATORY

Course: III — *Preparation: 32-4, and 32-7 and 33-1 taken concurrently*

Third year, both terms — *Six hours per week*

A series of experiments involving the testing of machines; together with experiments intended to elucidate practically the principles developed in the parallel course on alternating currents, 32-7, and also to train the student in the use of the special

types of instruments which he will later use in the laboratory work upon alternating current machinery.

Illustrative experiments are:

Stray power tests, Prony brake tests, retardation tests, pumping back tests, regulation tests, heat runs, analysis of losses, etc.

Study of A-C series and parallel circuits, resonant conditions, effect of frequency change on circuit constants, parallel operation of A-C machines, synchronizing and changing load, power factor measurements, power measurement in polyphase circuits, etc.

As the course progresses, the student is thrown more and more upon his own resources; a desired result is stated to him, and he is left to plan out his own methods, settle upon the apparatus needed, solve his precision requirements, calibrate the instruments, if necessary, and finally turn in a detailed report covering all phases of the work from its inception.

PROFESSOR SMITH,
MR. PORTER.

32-7 ELECTRICAL ENGINEERING

Course: III — *Preparation: 023-2, 032-3, 32-5*
Third year, both terms — *Four hours per week*

Lectures, recitations, and problem work upon the electromagnetic and electrostatic fields, variable, and alternating currents. Among the subjects covered are: solution of linear differential equations of the first and second degree with constant coefficients leading to the general equation of current in any circuit, transients and the establishment of the steady state, consideration of the steady state when the electromotive force follows the sine law, harmonic alternating currents complex quantity, vector representation, topographic representation, symbolic representation. Application of the principles developed to all possible combinations of resistance, inductive and condensive reactances in both single and polyphase circuits. The course is emphatically mathematical, involving the use of both Fourier series and hyperbolic functions, so that thorough comprehension of the preparatory mathematical subjects cannot be too strongly insisted upon. About two hundred problems are worked in class during the year.

PROFESSOR SMITH.

32-8 ELECTRICAL LABORATORY

Course: III — *Preparation: 32-7, 32-9 taken concurrently*

Fourth year, both terms — *Six hours per week*

Laboratory course to accompany Course 32-9 in alternating-current machinery. The work includes tests on the heating, efficiency, and determination of the characteristics of the various types of alternating-current machinery, such as transformers, generators, and motors. A detailed preliminary study is made of each assigned experiment, involving the theoretical principles, the method of procedure to obtain the required results, and the way in which the results should be worked up. This is embodied in a preliminary report. The student then does the necessary laboratory work to obtain the required data; and finally works up the whole into a detailed final report. The assistance given by the instructor is reduced to a minimum, the initiative and resourcefulness of the student being depended on to the greatest extent.

PROFESSOR DURKEE,
MR. PORTER.

32-9 ELECTRICAL ENGINEERING

Course: III — *Preparation: 32-7*

Fourth year, both terms — *Four hours per week*

A careful, thorough, and detailed discussion of the construction, theory, operating characteristics, and testing of the various types of alternating current machinery. The first half of the course is equally divided between the transformer and the synchronous generator. In the second half of the course synchronous motors, parallel operation of alternators, synchronous converters, polyphase induction motors, the induction generator, single phase induction motors, and commutating alternating-current motors are taken up. One two-hour period a week is spent in the solution of numerical problems.

PROFESSOR DURKEE.

33-1 ELECTRICAL MEASUREMENTS

Course: III — *Preparation: 023-2, 033-1, 32-5*

Third year, both terms — *Two hours per week*

A brief discussion of measurement in general and electrical measurements in particular, in which a review of the electrcal units and their definitions has a part. Resistance devices, galvanometers, ammeters, and voltmeters are next discussed, the treatment of other instruments being taken up later in connection with their uses. This is followed by a detailed discussion of the methods of measuring the various electrical quantities—resistance, resistivity, conductivity, current, electromotive force, capacitance, inductance, magnetic induction, permeability, hysteresis loss, energy, and power. The student is given a thorough treatment of the construction, theory of operation, method of use, sources of error, etc., of the types of measuring instruments used in commercial work and in the standardizing laboratory.

PROFESSOR DURKEE.

33-2 ELECTRICAL MEASUREMENTS LABORATORY

Course: III — *Preparation: 33-1 taken concurrently*

Third year, both terms — *Three hours per week*

A series of experiments emphasizing the principles developed in Course 33-1. The student becomes familiar with the use of the standard apparatus in use in testing laboratories. Particular stress is laid on the correct use of the apparatus, and precision discussions are required throughout.

The experiments cover such matters as the measurement of resistance by various methods, resistivity, conductivity, electromotive force, current inductance, capacitance, magnetic induction, magnetizing force, hysteresis loss, etc. Work is given in calibrating ammeters, voltmeters and watt-hour meters, in cable testing, magnetic testing, wave form determination, and the use of special apparatus such as the Kelvin bridge, Carey Foster bridge, potentiometer, etc.

PROFESSOR DURKEE.

34-1 ELECTRICAL ENGINEERING

Course: III — *Preparation: 13-1, 13-2, taken concurrently, 23-1, 32-7, 32-9, taken concurrently*

Fourth year, both terms — *Four hours per week*

A detailed study of the central station, both steam driven and hydroelectric, equally careful attention being given to the engineering and economic details, the influence of the various appliances upon the cost of power being kept constantly in view.

Following this comes a careful study of the high tension transmission line, the potentials used, spacing of conductors, line characteristics, losses, inductive effects upon neighboring circuits, quarterwave transmission, surges, etc.

After this is considered the sub-station and equipment, and then follows a full discussion of distribution systems and the utilization of electrical power, especial attention being given to railway operation, and the matter of out-door and interior illumination. The course closes with a brief discussion of the Public Utility in its relations to the community served.

PROFESSOR SMITH.

35-1 ADVANCED ELECTRICITY

Course: III — *Preparation: 32-7*

Fourth year, both terms — *Two hours per week*

The first term: a full descriptive discussion of modern electrical theory. Beginning with the state of electrical science in the time of Franklin, the development of the science is traced through the work of Faraday, Maxwell, Hertz, and Kelvin on the one hand; of Weber, Crookes, J. J. Thomson, Millikan, and others on the other. The subjects of metallic, electrolytic, and gaseous conduction are discussed, together with ionization, the theories of electromagnetic mass, and the electrical constitution of matter. The course closes with an elementary discussion of the principles of relativity.

PROFESSOR SMITH.

40-1 INORGANIC CHEMISTRY

Courses: I, II, III* — *Preparation: ——*
First year, fall term — *Four hours per week*

A course in inorganic chemistry designed to meet the needs of students in non-chemical courses. It includes a brief discussion of the general principles of chemistry as applied to engineering, with the idea of illustrating the applications of chemistry to special lines of engineering work.

MESSRS. STRAHAN AND BAKER

*Third year, first term.

41-1 INORGANIC CHEMISTRY

Course: IV — *Preparation: ——*
First year, both terms — *Four hours per week*

The fundamental principles of the science are taught by means of experimental lectures. Topics of a broad general character are taken up in the first part of the course, in connection with the descriptive chemistry of the non-metallic elements, followed later by more specialized work in connection with the elements. Recitations will include a short written test on the two lectures of the week. Special attention is given to chemical calculations based on practical application.

MR. STRAHAN.

41-2 INORGANIC CHEMICAL LABORATORY

Course: IV — *Preparation: 41-1 taken concurrently*
First year, both terms — *Five hours per week*

The object of the course is to cultivate scientific attitude and habit of thought on the part of the student, and to increase his power of acquiring knowledge, whether it be from book, lecture, or from experiment. The experiments are planned to illustrate the topics which have been discussed in the lecture room. Careful manipulations, thoroughness in observation, accuracy in arriving at conclusions are required of each student. In this, as in all subsequent laboratory work, neat and satisfactory notes will be considered an essential part of the work.

MR. STRAHAN.

42-1 QUALITATIVE ANALYSIS

Course: IV — *Preparation: 41-1, 41-2*
Second year, both terms — *Two hours per week*

The course is designed not merely to consider the procedures used in the detection of the common elements, but to deal in a much broader way with the principles involved in chemical analysis and to broaden the student's knowledge of inorganic chemistry, especially the chemistry of the metallic elements. In the latter part of the course questions involving the analysis of unusual mixtures will be discussed with especial emphasis on the interpretation of analytical results.

PROFESSOR WILLIAMS.

42-2 QUALITATIVE ANALYSIS LABORATORY

Course: IV — *Preparation: 42-1 taken concurrently*
Second year, both terms — *Five hours per week*

After a series of preliminary experiments illustrating principles and giving opportunity for practice in writing equations, the analysis of unknown substances is undertaken, beginning with solutions and simple salts, and later analyzing minerals, pigments, slags, alloys and various commercial products, such as boiler compounds, cleaning powders, glass, enamels, and similar inorganic substances.

MR. STRAHAN.

43-1 QUANTITATIVE ANALYSIS

Course: IV — *Preparation: 42-1, 42-2*
Third year, fall term — *Two hours per week*

The general principles of quantitative analysis. Half of the time is devoted to the consideration of typical methods in gravimetric analysis: such as, the determination of chloride in salt, the analysis of ferrous sulphate for iron and the sulphate, the complete analysis of brass, and other analyses involving general principles of procedure. The other half of the time is devoted to the methods of volumetric analysis as illustrated in the use of acid and alkali determinations, oxidation methods involving bichromate, permanganate and iodine, and the methods of volu-

metric precipitation. Special attention is given to chemical calculations, and the solution of numerous analytical problems is one of the essential features of the course.

PROFESSOR WILLIAMS.

43-2 QUANTITATIVE ANALYSIS LABORATORY

Course: IV — *Preparation: 43-1 taken simultaneously*

Third year, fall term — *Five hours per week*

Analytical practice illustrating the methods discussed in Course 43-1. The calibration of burettes, the use and care of analytical balances, and a limited number of typical gravimetric and volumetric analyses are included in the course, in which great stress is laid on the accuracy, care, and integrity necessary for successful quantitative work.

MR. BAKER.

44-1 TECHNICAL ANALYSIS

Course: IV — *Preparation: 43-1, 43-2*

Third year, spring term — *Two hours per week*

A continuation of Course 43-1 dealing more specifically with the methods of testing used in connection with industrial operations. It will include the rapid methods for steel, the analysis of boiler waters, gases, fuels, oils, paints, varnishes, and similar substances.

PROFESSOR WILLIAMS.

44-2 TECHNICAL ANALYSIS LABORATORY

Course: IV — *Preparation: 44-1 taken concurrently*

Third year, spring term — *Five hours per week*

Designed to illustrate by a limited number of analyses the technical methods of quantitative analysis. Problems will be assigned individually, depending on the student's future plans or his inclination, and will be selected from the fields of steel analysis, gas and fuel analysis—including calorific testing, water analysis. Time is devoted to the study of pigments, soaps, or in general in the analysis of that class of materials in which the student is most interested.

MR. BAKER.

45-1 ORGANIC CHEMISTRY

Course: IV — *Preparation: 43-1 and 43-2 taken concurrently*

Third year, both terms — *Three hours per week*

The underlying principles and theories of organic chemistry, the methods of preparation, and characteristic reactions of carbon compounds. The important organic compounds will be considered in detail; because they serve as the most convenient examples for illustrating fundamental principles which elucidate the chemical character of substances which are of practical importance.

MR. STRAHAN.

45-2 ORGANIC CHEMISTRY LABORATORY

Course: IV — *Preparation: 45-1 taken concurrently*

Third year, both terms — *Five hours per week*

The operations, apparatus, and the laboratory technique involved in organic work: such as, fractional distillation, extraction, crystallization, steam distillation, determinations of melting points, boiling points, and the like. It deals also with general methods of preparation, such as etherification, saponification, sulphonation, diazotization, etc. The student will prepare a number of compounds—including nitro-benzene, aniline, ethers, phenols, and other typical organic substances.

MR. BAKER.

45-3 ORGANIC CHEMISTRY

Course: IV — *Preparation: 45-1*

Fourth year, both terms — *Two hours per week*

A review of Course 45-1 is given, but the subject is studied from a more mature point of view. Emphasis is placed on the effect of the nature of organic radicals on the properties of the compounds containing them, the effect of unsaturation, and the influence of structure and substituents on the activity of radicals.

Industrially important compounds are treated more at length than those of a purely scientific use and of interest to the advanced students only.

During the latter part of the course outside reading will be assigned in the scientific journals, followed by reports and discussions.

MR. RADASCH.

45-4 ORGANIC CHEMISTRY LABORATORY

Course: IV — *Preparation: 45-3 taken concurrently*

Fourth year, both terms — *Five hours per week*

Preparations and reactions of typical organic substances—including the methods of separation and identification of simple mixtures. The instruction also includes a study of the qualitative tests for the important elements occurring in organic compounds, and quantitative determinations of carbon, hydrogen, and nitrogen.

MESSRS. STRAHAN AND BAKER.

46-1 CHEMICAL ENGINEERING

Course: IV — *Preparation: 13-1, 23-3, 43-1, 48-1 taken concurrently*

Fourth year, both terms — *Three hours per week*

The principles underlying the mechanical operations involved in chemical industries, together with a study of the apparatus used to perform these operations, are discussed in the class room and are further illustrated by the solution of typical problems of a chemical engineering nature. The study of stoichiometrical relations as applied to chemical industry, the flow of heat, crushing and grinding, separation, filtration, evaporation, distillation, and the flow of fluids are among the subjects considered at length.

MR. RADASCH.

47-1 INDUSTRIAL CHEMISTRY

Course: IV — *Preparation: 44-1, 45-2*

Fourth year, both terms — *Three hours per week*

The more important industrial processes are studied with a view to the general chemistry involved and to the various types of apparatus necessary to carry out the chemical reactions. The student is given a broad survey of the field of chemical industry and a knowledge of the relationships of the different

industries to one another. The industries studied include the production of acids, alkali, fertilizers, glass, pigments, cements, soap, explosives, paper, petroleum, illuminating gas, and other general chemicals.

MR. RADASCH.

47-2 INDUSTRIAL CHEMICAL LABORATORY

Course: IV — *Preparation: 47-1 taken concurrently*
Fourth year, fall term — *Eight hours per week*

The quantitative study of the preparation and purification of a small number of chemical products, selected as types of reactions of industrial importance. The processes employed are carefully controlled, and the final products are analyzed to determine their purity. When the work is completed, a careful detailed report of each process is made and discussed in class.

MR. RADASCH.

48-1 PHYSICAL CHEMISTRY

Course: IV — *Preparation: 41-1, 42-1, 43-1*
Fourth year, both terms — *Four hours per week*

The more important principles of Theoretical Chemistry are treated with great thoroughness and are illustrated by applying them to a large variety of problems. The principles are further illustrated by lecture experiments. During the course the following subjects are considered: pressure volume relations of gases and solutions, derivation of molecular and atomic weights, conductivity of solutions, ionic theory and mass action law, effect of temperature on chemical equilibrium, the laws of energy with reference to the production of heat and work, the electro-motive force of voltaic cells, and other electro-chemical topics.

DR. PARSONS.

50-1 ENGINEERING CONFERENCE

Courses: I, II, III, IV — *Preparation: ——*
Second, third and fourth years, both terms — *One hour per week*

The connecting link between the industry and the class room. The second, third, and fourth year men of each course meet in

four separate groups for four of the five meetings, during each period. Each student in turn gives a fifteen minute to half hour talk on some particular phase of his own job. This talk then becomes the subject of discussion by the whole class and the problem is considered in as much detail as seems best to the instructor.

For the fifth meeting of each period all courses meet together in Bates Hall and hear some speaker on a technical subject of live interest to all engineering students.

It is in this course that the student receives his rating for the outside work. The general characteristic marks as turned in by the co-operating firm, the marks for the reports written each period while at work, and the marks for the individual talk, are averaged in due proportion to find the grade due the student for his Engineering Practice mark.

PROFESSORS NASH AND DURKEE,
MESSRS. STEARNS AND STRAHAN.

51-1 THESIS

Courses: I, II, III, IV — *Preparation: Technical courses*
Fourth year, both terms — *One hour per week*

Each student in every course in order to become a candidate for the degree must present a thesis showing an original investigation in some branch of their course. Each student chooses a subject for his thesis after consultation with the head of his department.

This thesis is intended primarily to test the student's ability to do original work along technical lines. The problem undertaken may be in the nature of a research, an original design, a test, or a laboratory experiment provided that the work is done in a thorough business like manner and a well balanced report, including working drawings in the case of a design, is presented. While only one hour per week is scheduled for consultation with the instructor to direct the student's efforts along the proper channels the student should choose a subject of sufficient weight to require at least three hours of preparation per week during the first term and six hours per week during the second term of the senior year. More weight is given to

the manner in which the student attacks and carries through his thesis than to the actual results obtained, and for this reason the completed thesis must contain not only the complete description of the investigation and its results but also a general review of, or references to, the reading done in connection with the work. Students may work together on an important investigation but individual initiative is always encouraged.

All theses must be approved by the Dean before acceptance and are to be handed to him not later than the first day of the second term examination period. They must be submitted in form suitable for binding, being written on standard school thesis paper 8 inches by 10½ inches with a one inch margin on each side. Upon acceptance the thesis becomes the property of the school and is not to be printed or published without the consent of the Faculty.

90-1 PHYSICAL TRAINING

Courses: I, II, III, IV — *Preparation: ——*
All terms — *Two hours per week*

All students are required to take this course. Health, strength, and vitality do not come by chance, but by obedience to natural laws. It is very essential for the students to acquire good habits of life. The work in the gymnasium is of the body building type with plenty of competition. Regular classes in calisthenics are held under an able physical instructor.

Students who are members of the Varsity Squads in any of the major sports may be excused from Physical Training upon petition to the Faculty providing the petition is supported by the certification of the Athletic Coach and Physical Director. Upon petition of a student to be excused from Physical Training, owing to physical disability, favorable action will be taken by the Faculty only when said petition is accompanied by a physician's certificate, verifying the disability.

MR. SINNETT.

SUBJECTS OF INSTRUCTION

No.	SUBJECT	Course	Year
010–1	English	I, II, III, IV	1
020–1	College Algebra	I, II, III, IV	1
021–1	Trigonometry	I, II, III, IV	1
022–1	Analytic Geometry	I, II, III, IV	1
023–1	Calculus	I, II, III, IV	2
023–2	Calculus	I, II, III, IV	2
030–1	Physics Laboratory	I, II, III, IV	1
031–1	Physics	I, II, III, IV	1
031–2	Physics Laboratory	I, II, III, IV	2
032–1	Light	I, II, III, IV	2
032–2	Physics Laboratory	I, II, III, IV	2
032–3	Heat	I, II, III, IV	2
033–1	Precision of Measurements	II, III	2
041–1	Mechanical Drawing	I, II, III, IV	1
041–2	Mechanical Drawing	I, IV	1
041–3	Mechanical Drawing	II, III	1
042–1	Machine Drawing	I, IV	2
042–2	Machine Drawing	I, IV	2
042–3	Machine Drawing	II, III	2
042–4	Machine Drawing	II	2
043–1	Descriptive Geometry	I, II, III, IV	1
044–1	Mechanism	I, III, IV	2
044–2	Mechanism	II	2
044–3	Mechanism	II	2
051–1	Geology	I, II	3
061–1	Economics and Sociology	I, II, III, IV	1
062–1	Government	I, II, III, IV	2
063–1	History of Science	I, II, III, IV	3
064–1	German	IV	4
11–1	Surveying	I	1
11–2	Surveying Field and Practice	I	1
11–3	Surveying	I	2
11–4	Surveying Field and Practice	I	2
11–5	Surveying	II, III	3
12–1	Railroad Surveying	I	2
12–2	Railroad Surveying Field and Practice	I	2
12–3	Railroad Engineering	I	3
12–4	Railroad Engineering Field and Practice	I	3
13–1	Hydraulics	I, II, III, IV	3
13–2	Hydraulic Motors	II, III	4
14–1	Theory of Structures	I	3
14–2	Structural Drawing	I	3
14–3	Engineering Structures	I	4
14–4	Structural Design	I	4
15–1	Concrete	I, II	4
15–2	Concrete Design	I, II	4
16–1	Materials	I, II*, III*	4
16–2	Testing Materials Laboratory	I	4
16–3	Foundations	I	4
17–1	Highway Engineering	I	4
21–1	Applied Mechanics	I, II, III, IV	2
21–2	Strength of Materials	I, II	3
21–3	Strength of Materials	III, IV	3
22–1	Graphical Analysis	II	3
22–2	Elementary Machine Design	II	3
22–3	Machine Design	II	4

SUBJECTS OF INSTRUCTION

No.	SUBJECT	Course	Year
23–1	Heat Engineering	II, III	3
23–2	Engineering Laboratory	II, III	4
23–3	Heat Engineering	I, IV	3
23–5	Heat Engineering	II	4
24–1	Production Engineering	II	1
24–2	Production Engineering	II	1
24–3	Power Plant Equipment	II	3
24–4	Journals and Reports	II	4
24–5	Journals and Reports	II	4
24–6	Standard Engineering Products and Processes	II, III	4
25–1	Industrial Plants	II	4
30–1	Elements of Electricity	I, II, IV	2
30–3	Applied Electricity	I, II, IV	3
30–4	Applied Electricity Laboratory	I, II, IV	3
31–1	Elements of Electrical Engineering	III	1
32–1	Electrical Engineering	III	1
32–2	Electrical Engineering Laboratory	III	1
32–3	Electrical Engineering	III	2
32–4	Electrical Engineering Laboratory	III	2
32–5	Electrical Engineering	III	2
32–6	Electrical Engineering Laboratory	III	3
32–7	Electrical Engineering	III	3
32–8	Electrical Engineering Laboratory	III	4
32–9	Electrical Engineering	III	4
33–1	Electrical Measurements	III	3
33–2	Electrical Measurements Laboratory	III	3
34–1	Electrical Engineering	III	4
35–1	Advanced Electricity	III	4
40–1	Inorganic Chemistry	I,* II, III	1
41–1	Inorganic Chemistry	IV	1
41–2	Inorganic Chemistry Laboratory	IV	1
42–1	Qualitative Analysis	IV	2
42–2	Qualitative Analysis Laboratory	IV	2
43–1	Quantitative Analysis	IV	3
43–2	Quantitative Analysis Laboratory	IV	3
44–1	Technical Analysis	IV	3
44–2	Technical Analysis Laboratory	IV	3
45–1	Organic Chemistry	IV	3
45–2	Organic Chemistry Laboratory	IV	3
45–3	Organic Chemistry	IV	4
45–4	Organic Chemistry Laboratory	IV	4
46–1	Chemical Engineering	IV	4
47–1	Industrial Chemistry	IV	4
47–2	Industrial Chemistry Laboratory	IV	4
48–1	Physical Chemistry	IV	4
50–1	Engineering Conference	I, II, III, IV	2, 3, 4
51–1	Thesis	I, II, III, IV	4
90–1	Physical Training	I, II, III, IV	1.2.3.4

*Third year

SCHOOL OF ENGINEERING

REGISTER OF STUDENTS

Enrolled During the School Year 1920-1921

NAME	COURSE	YEAR	HOME ADDRESS
Abramson, Samuel	Ch. E.	1921	*Roxbury*
Abromson, Harry P.	Ch. E.	1921	*Cambridge*
Abromson, Onne	Ch. E.	1921	*Cambridge*
Addison, Ernest H.	E. E.	1924	*Byfield*
Aimo, Karl H.	C E.	1923	*Allston*
Albert, Samuel	E. E.	1921	*Beverly*
Alderman, Leon D.	M. E.	1924	*Beverly*
Allen, Charles R.	M. E.	1923	*Pittsfield*
Allen, Earle C.	C. E.	1922	*Holbrook*
Allen, Earle F.	E. E.	1923	*Augusta, Me.*
Almond, William H.	E. E.	1924	*Fall River*
Alves, John J.	M. E.	1922	*Provincetown*
American, Arsham P.	C. E.	1923	*Boston*
Ammidown, Theodore W.	M. E.	1924	*Boston*
Anderson, E. Allen	Ch. E.	1924	*Norwood*
Anderson, Henry G.	M. E.	1924	*West Roxbury*
Aquino, Serafin	Ch. E.	1924	*San Juan, Porto Rico*
Arata, Claude J.	E. E.	1923	*Hallowell, Me.*
Atkinson, Ralph L.	Ch. E.	1921	*Dorchester*
Augusta, Harold C.	E. E.	1924	*Dorchester*
Baader, Albert S.	E. E.	1924	*Everett*
Bader, Charles A.	M. E.	1924	*Easthampton*
Bailey, Arthur H.	M. E.	1924	*Brookfield*
Bailey, Louis M.	E. E.	1923	*So. Duxbury*
Bailey, Percy W.	E. E.	1922	*Kingston*
Baird, Charles O.	C. E.	1924	*Lynn*
Baker, Charles G.	E. E.	1923	*Georgetown*
Baker, Clifford D.	M. E.	1923	*Beverly*
Balcom, George M.	E. E.	1924	*Natick*
Ballou, George	C. E.	1922	*Boston*
Bamford, Joseph A.	C. E.	1924	*Everett*
Barber, Dana H.	M. E.	1924	*Newton*
Barker, Charles K.	E. E.	1923	*Natick*
Barney, Kenneth M.	E. E.	1924	*Dorchester*
Barrett, Roger N.	E. E.	1924	*Marlboro*
Barry, John J.	E. E.	1924	*Salem*
Bartlett, James H., Jr.	C. E.	1924	*Quincy*
Bearse, Richard C.	Ch. E.	1923	*Springfield*
Beattie, Robert	M. E.	1924	*Everett*
Becker, Abraham A.	Ch. E.	1923	*Cambridge*
Bennett, Lester L.	E. E.	1924	*Everett*
Benson, Raymond H.	M. E.	1924	*Athol*
Bentley, Stanley	E. E.	1924	*Mattapan*
Berlyn, Lewis	E. E.	1923	*Salem*
Bernier, Raymond E.	E. E.	1924	*Springfield*
Berry, George F.	C. E.	1923	*Baldwinville*

NAME	COURSE	YEAR	HOME ADDRESS
Bessom, Ralph	M. E.	1922	*Lynn*
Betzen, Karl V.	M. E.	1924	*Winthrop*
Bigelow, Cecil H.	M. E.	1923	*Monument Beach*
Bigelow, Maurice H.	Ch. E.	1924	*Concord*
Bingham, Lloyd A.	E. E.	1924	*Middlebury, Vt.*
Blake, Howard J.	Ch. E.	1924	*Boston*
Bliss, Raymond	M. E.	1923	*Winthrop*
Bliss, Theodore B.	Ch. E.	1923	*Jamaica Plain*
Bluemer, Edwin F.	Ch. E.	1923	*Brookfield*
Boardman, Raymond E.	Ch. E.	1924	*Natick*
Bodemer, Philip E.	C. E.	1924	*Cambridge*
Boden, Arthur T.	E. E.	1923	*Beverly*
Boomhover, Roger P.	M. E.	1924	*Salem*
Bouchard, George H.	Ch. E.	1924	*Salem*
Bourne, Arthur E.	M. E.	1924	*Melrose*
Boyd, Ronald A.	E. E.	1924	*Taunton*
Boyd, Thomas P.	M. E.	1922	*Chelsea*
Bradbury, Raymond	M. E.	1922	*New Britain, Conn.*
Bradford, Cecil B.	M. E.	1924	*Plainfield, Conn.*
Bradstreet, Raymond	Ch. E.	1922	*Middleton*
Brainard, Francis D.	C. E.	1924	*Danvers*
Brask, Henry	C. E.	1923	*Attleboro*
Breen, John J.	E. E.	1924	*Rockport*
Brennan, James F.	M. E.	1923	*Salem*
Britchky, Hyman	Ch. E.	1922	*Foxboro*
Brooks, Curtis C.	M. E.	1924	*No. Hanover*
Brooks, Francis W.	M. E.	1922	*Belmont*
Brooks, John S.	M. E.	1924	*No. Hanover*
Brown, Alfred	Ch. E.	1924	*Everett*
Brown, Bernard C.	C. E.	1924	*Georgetown*
Brown, Martin	M. E.	1921	*Boston*
Brown, Murray	E. E.	1924	*Lynn*
Brown, Ralph E.	E. E.	1922	*Rockland*
Brown, Richard B.	E. E.	1922	*Plymouth*
Buckler, John A.	E. E.	1924	*Springfield*
Burbeck, Stanley O.	M. E.	1924	*Woodsville, N. H.*
Burke, George L.	C. E.	1924	*Norwood*
Bushnell, Laverne	M. E.	1923	*Dedham*
Butterworth, Percy T.	E. E.	1923	*Forest Hills*
Caldwell, Charles W.	Ch. E.	1924	*Jamaica Plain*
Callanan, Herbert A.	M. E.	1922	*Danvers*
Callanan, Walter L.	E. E.	1924	*Danvers*
Campbell, Oscar J.	M. E.	1924	*Hudson, N. H.*
Canney, True D.	E. E.	1924	*Melrose*
Carl, James W.	M. E.	1922	*Cambridge*
Carlsen, Fred H.	E. E.	1922	*Gloucester*
Carpenter, George D.	C. E.	1924	*Cambridge*
Carr, Thomas F.	C. E.	1924	*Marlboro*
Carroll, Francis R.	Ch. E.	1923	*Cambridge*
Carter, Curtis S., Jr.	E. E.	1921	*Haverhill*
Caswell, Orville G.	M. E.	1923	*East Lynn*
Cates, Lewis G.	C. E.	1922	*Boston*
Chadwick, Earle R.	E. E.	1924	*Blandford*

NAME	COURSE	YEAR	HOME ADDRESS
Chandler, Warren M.	E. E.	1924	*Brockton*
Chapman, Allen E.	E. E.	1924	*Stoneham*
Chase, Charles S.	E. E.	1922	*Leicester*
Chase, Fred W., Jr.	C. E.	1924	*Newburyport*
Cheifitz, Harry	M. E.	1924	*No. Wilmington*
Cheney, Norman E.	M. E.	1921	*Avon*
Chilson, Warren A.	Ch. E.	1924	*Milford*
Chouinard, Louis H.	C. E.	1924	*Thompsonville, Conn.*
Christenson, Henry L.	E. E.	1924	*Lee*
Clahane, John	C. E.	1924	*Concord*
Clarke, Kenneth O.	E. E.	1922	*Kingston*
Clarke, Robert H.	M. E.	1923	*Melrose Highlands*
Clarke, William R.	E. E.	1924	*Wallingford, Conn.*
Cleary, Walter B.	C. E.	1924	*Boston*
Cleaves, Royden F.	M. E.	1924	*Rochester, N. H.*
Cleaves, Wynne P.	Ch. E.	1924	*Waltham*
Clements, George F.	C. E.	1921	*Somerville*
Clifford, Eugene F.	E. E.	1924	*Newton Highlands*
Coakley, Roger G.	M. E.	1924	*Beverly*
Cobban, John D.	M. E.	1924	*Groveland*
Coburn, Wendell F	Ch. E.	1924	*Braintree*
Coffin, Charles C.	M. E.	1924	*Nantucket*
Colburn, Hardy R.	M. E.	1924	*Boston*
Collins, Desmond M.	M. E.	1921	*Dorchester*
Connell, John H.	Ch. E.	1923	*Roxbury*
Converse, Everett C.	M. E.	1923	*Springfield*
Cook, Harold S.	C. E.	1922	*Boston*
Cook, Hiram J.	M. E.	1923	*Franklin*
Cooke, Frank N., Jr.	E. E.	1923	*Danvers*
Cooke, Howard W.	E. E.	1922	*Athol*
Coombs, Seldon P.	M. E.	1922	*Medford*
Cooper, Charles S.	C. E.	1924	*Roxbury*
Cooper, George I.	Ch. E.	1924	*Dorchester*
Cooper, Raphael D.	M. E.	1921	*Gloucester*
Cox, Allan N.	Ch. E.	1924	*Wellesley*
Crabtree, Holmes P.	M. E.	1924	*Melrose*
Crafts, Harold W.	E. E.	1924	*Ashfield*
Cramer, George W.	C. E.	1921	*Willimansett*
Cressy, Dustin G.	E. E.	1922	*W. Somerville*
Crossman, Hartwell H.	C. E.	1923	*Barrowsville*
Cummings, John J.	C. E.	1923	*Roxbury*
Cummings, Roscoe L.	Ch. E.	1924	*Belmont*
Cundari, Frank A.	C. E.	1921	*So. Boston*
Cundari, Joseph V.	Ch. E.	1924	*So. Boston*
Curran, Francis M.	M. E.	1924	*Holyoke*
Curtis, Freeman D.	M. E.	1924	*Somerville*
Cushing, Levi G.	E. E.	1923	*So. Duxbury*
Cushing, Samuel A.	E. E.	1924	*Beverly*
Cusolito, Lawrence A., Jr.	Ch. E.	1924	*Boston*
Damiani, Roland	C. E.	1924	*Beverly*
Damon, Donald B.	Ch. E.	1923	*Keene, N. H.*
Davis, Leon P.	C. E.	1923	*Kennebunk, Me.*
Davis, Stuart S.	E. E.	1922	*Beverly*

NAME	COURSE	YEAR	HOME ADDRESS
Dawe, Allen S.	C. E.	1923	*Cambridge*
Dearborn, Elmore L.	C. E.	1922	*Hampton, N. H.*
Deery, Joseph	M. E.	1924	*Fitchburg*
Dennis, Francis F.	C. E.	1922	*Salem*
Deuse, James	M. E.	1924	*Chester, Conn.*
Dingwall, Addison P.	E. E.	1924	*No. Weymouth*
Dixon, Herbert C.	C. E.	1923	*Gloucester*
Doane, Kendric P.	C. E.	1921	*Groveland*
Donnelly, Robert L.	C. E.	1923	*Beverly*
Douglas, Alton L.	M. E.	1923	*East Hiram, Me.*
Dove, Walter F.	C. E.	1924	*Dover*
Downey, Ralph S.	M. E.	1922	*Hingham*
Drapeau, Lucien	C. E.	1924	*Lowell*
Durgin, Harold L.	C. E.	1924	*Kittery, Me.*
Duston, Carmillus W.	M. E.	1923	*Wellesley*
Dyer, Nathaniel B.	E. E.	1923	*Salem*
Dyke, Herman R.	E. E.	1924	*Livermore Falls, Me.*
Dyson, Charles A.	M. E.	1924	*Springfield*
Eldridge, Gordon B.	Ch. E.	1924	*Concord*
Elliott, Frank R.	Ch. E.	1924	*Springfield*
Ellis, Russell F.	M. E.	1924	*Southington, Conn.*
Ellms, Lindsay	E. E.	1923	*Cohasset*
Ely, Rodney B.	C. E.	1924	*Centerbrook, Conn.*
Emery, Carl B.	C. E.	1924	*Portland, Me.*
Engstrand, Waldo	E. E.	1923	*Cranston, R. I.*
Engstrom, Howard T.	Ch. E.	1922	*Plymouth*
Erskine, James S.	E. E.	1923	*Newburyport*
Everett, Albert E.	C. E.	1923	*Everett*
Ewell, Frederick A.	E. E.	1924	*Medford*
Falt, Gordon H.	E. E.	1924	*Northeast Harbor, Me.*
Farley, Arthur W.	M. E.	1922	*Salem*
Faunce, Lawrence S.	M. E.	1922	*E. Rochester, N. H.*
Fearing, Edward W.	E. E.	1921	*So. Weymouth*
Ferguson, Arthur W.	E. E.	1924	*Everett*
Ferguson, John H.	Ch. E.	1924	*Rochester, N. H.*
Fiske, Paul A.	E. E.	1924	*Waltham*
Fitzmaurice, John V.	C. E.	1924	*Marlboro*
Flagg, Walter E.	E. E.	1922	*Wellesley*
Flanders, Henry R.	E. E.	1923	*Vineyard Haven*
Flood, Frank L.	C. E.	1922	*Framingham*
Foisie, George E.	C. E.	1923	*Nashua, N. H.*
Ford, James B.	E. E.	1924	*Melrose*
Foster, Harry B.	E. E.	1924	*Medford*
Fowler, William H.	C. E.	1922	*Melrose*
Fox, Edward	Ch. E.	1922	*Roxbury*
Fox, F. Sumner	E. E.	1922	*Newburyport*
Fraser, William A.	E. E.	1923	*Vinalhaven, Me.*
Freeman, Isadore	Ch. E.	1924	*Winthrop*
Freeman, James A.	C. E.	1924	*Attleboro Falls*
Frye, Richard	M. E.	1922	*Royalston*
Fundin, Hjalmar O. E.	M. E.	1923	*Mattapan*
Furrier, Joseph P.	C. E.	1923	*Lynn*
Fusek, Joseph	M. E.	1923	*Budapest, Hungary*

NAME	COURSE	YEAR	HOME ADDRESS
Gadaire, Clifford E.	C. E.	1924	*Brookfield*
Gaffey, Francis	M. E.	1922	*Salem*
Gaffney, Melvin S.	E. E.	1924	*Essex*
Gallagher, George T.	C. E.	1924	*Dorchester*
Garney, Emery W.	C. E.	1924	*Bridgewater*
Gilbert, Merton L.	E. E.	1923	*Cohasset*
Gillis, John A.	M. E.	1924	*Cohasset*
Gladding, Richard S.	Ch. E.	1922	*Beverly*
Gleason, Carl B.	Ch. E.	1923	*Marblehead*
Goddard, George W.	M. E.	1924	*Somerville*
Gold, Myer	E. E.	1924	*Avon, Conn.*
Gordon, Morris J.	Ch. E.	1921	*Boston*
Gordon, Phineas	C. E.	1923	*Boston*
Goucher, Charles L.	C. E.	1922	*Milford*
Gould, Joseph E.	Ch. E.	1922	*Roxbury*
Goulet, Narcisse T.	Ch. E.	1922	*Pawtucket, R. I.*
Graham, Warren J.	M. E.	1924	*Marlboro*
Gray, Ernest W.	Ch. E.	1923	*Scituate*
Greene, Harold L.	E. E.	1924	*West Hanover*
Grover, James M.	Ch. E.	1924	*Wellesley*
Grozier, John W.	E. E.	1923	*Foxboro*
Grushky, Maurice	C. E.	1924	*Beverly*
Gunther, Frederick E.	E. E.	1922	*Roslindale*
Haines, Joseph E.	M. E.	1924	*Boston*
Hale, Harold W.	C. E.	1922	*Swansea*
Hall, Earl L.	E. E.	1924	*Hardwick, Vt.*
Hammond, Cleon C.	E. E.	1923	*Abington*
Harding, Arthur E.	C. E.	1922	*Boston*
Harlow, Elmer R.	C. E.	1924	*Plymouth*
Harrington, Frank C.	E. E.	1924	*Putnam, Conn.*
Harrington, Webster F., Jr.	M. E.	1924	*So. Lincoln*
Haskell, J. Reginald	M. E.	1924	*Webster*
Haskins, Howard L.	M. E.	1924	*Wollaston*
Haslam, Fenton J.	Ch. E.	1924	*Keene, N. H.*
Hatch, Douglas P.	M. E.	1923	*Lynn*
Hathaway, Chauncey E.	Ch. E.	1922	*Dorchester*
Hawks, Robert A.	E. E.	1924	*Newton Center*
Hayes, John A.	Ch. E.	1924	*So. Boston*
Heap, Sheldon S.	E. E.	1921	*Atlantic*
Heinlein, Martin L.	E. E.	1923	*So. Natick*
Henry, Malcolm C.	E. E.	1924	*Bridgeport, Conn.*
Hiatt, Frank C.	E. E.	1923	*Malden*
Hill, George B.	Ch. E.	1923	*Berlin, N. H.*
Hills, Charles S.	E. E.	1921	*So. Natick*
Hitchcock, Roy C.	E. E.	1924	*Conway*
Hjelmberg, Arthur G.	M. E.	1923	*Boston*
Hobart, Merrill C.	C. E.	1924	*Quincy*
Holland, Carl T.	E. E.	1923	*Nantasket*
Holthaus, Frederick J.	E. E.	1922	*Beachmont*
Hopkins, Forrest R.	M. E.	1923	*Franklin, N. H.*
Howard, J. Masury	E. E.	1924	*Providence, R. I.*
Howe, Bernard R.	E. E.	1924	*Fryeburg, Me.*
Howe, Myron	C. E.	1921	*Framingham*

NAME	COURSE	YEAR	HOME ADDRESS
Hubby, Leon F.	E. E.	1924	*Lee*
Hulsman, David L.	Ch. E.	1922	*Everett*
Hulsman, Kenneth G.	C. E.	1924	*Everett*
Huntington, Clarence M.	M. E.	1923	*Cambridge*
Ireland, Theodore S.	M. E.	1922	*Gloucester*
Irish, Herbert W.	E. E.	1924	*Waltham*
Jacobson, Howard V.	E. E.	1924	*Concord*
Jennings, Lawrence W.	M. E.	1923	*Winthrop*
Johnson, Joseph E.	M. E.	1923	*Roxbury*
Johnson, Paul R.	C. E.	1924	*Feeding Hills*
Johnson, Walter A.	M. E.	1924	*Dorchester*
Johnston, Edwin D.	E. E.	1924	*Groveland*
Jones, Archibald L.	E. E.	1923	*Middleton*
Jones, Harold H.	C. E.	1923	*Swampscott*
Jordan, John E., 2nd	Ch. E.	1924	*Gloucester*
Junior, Francis	C. E.	1922	*Plymouth*
Katranis, George A.	E. E.	1924	*Sourjsy, Greece*
Keene, Burton F.	E. E.	1923	*So. Hanson*
Keith, James B.	Ch. E.	1921	*Elmwood*
Kelleher, James J.	M. E.	1922	*Salem*
Kelleher, John P.	M. E.	1924	*Charlestown*
Kelley, Thomas G.	M. E.	1922	*Roslindale*
Kelly, Harold W.	C. E.	1924	*Dorchester*
Kendrew, Albert E.	C. E.	1924	*Roslindale*
Kennedy, Walter	E. E.	1923	*Concord Junction*
Kenney, David J.	C. E.	1923	*Boston*
Kenney, Francis B.	C. E.	1924	*Manchester, N. H.*
Kenney, John H.	M. E.	1923	*Boston*
King, William H.	E. E.	1924	*Everett*
Knight, Frank L.	E. E.	1924	*Malden*
Knight, Vernon H.	E. E.	1924	*Brockton*
Knopp, Otto R. H.	E. E.	1923	*E. Taunton*
Kneupfer, Charles F.	M. E.	1923	*Boston*
Kosak, Nathaniel	Ch. E.	1924	*Everett*
Kumpel, Edgar W.	C. E.	1924	*Everett*
LaBree, Frank H.	E. E.	1921	*Medford Hillside*
LaMarche, Logan	C. E.	1923	*Cambridge*
Lamarine, Alfred E.	E. E.	1924	*Natick*
Lamson, Myles	E. E.	1924	*Belmont*
Lancaster, Elon F.	E. E.	1923	*Madison, Me.*
Landry, Herbert A.	M. E.	1921	*Norwood*
Lane, Charles M., Jr.	E. E.	1924	*Hartford, Conn.*
Lane, Roy H.	Ch. E.	1924	*Rockport*
Lanois, Ovide S.	C. E.	1924	*Marlboro*
Larson, C. William	M. E.	1923	*Worcester*
Lassof, Israel	Ch. E.	1924	*Lexington*
Lattanzi, Alfred	C. E.	1921	*Everett*
Laubenstein, Karl G.	Ch. E.	1924	*Maynard*
Lauretzen, Walter M.	Ch. E.	1924	*Mattapan*
Law, William H.	C. E.	1924	*Rockport*
Lawler, G. Harold	E. E.	1922	*Newburyport*
Lawler, John D.	Ch. E.	1923	*Lowell*
Leavitt, Curtis G.	C. E.	1924	*Taunton*

NAME	COURSE	YEAR	HOME ADDRESS
Leavitt, Howard L.	E. E.	1924	*Roxbury*
Lee, I. Albert	E. E.	1922	*Salem*
Lee, Alfred	E. E.	1924	*Lawrence*
Lee, Walter H.	C. E.	1922	*Dorchester*
Letourneau, Roland F.	Ch. E.	1923	*Rockland*
Levin, Eli	Ch. E.	1923	*Roxbury*
Levine, Samuel	C. E.	1922	*Roxbury*
Levy, E. Frank	Ch. E.	1924	*Lynn*
Levy, Hyman	E. E	1923	*Boston*
Lewis, Clarence W.	E. E.	1924	*Beverly*
Lewis, Ervin H.	E. E	1923	*Newtonville*
Lilley, Wallace H.	C. E.	1923	*Chicopee*
Lindsay, Edward A.	M. E.	1924	*Wollaston*
Lindskog, Sidney W.	E. E.	1924	*Brockton*
Lord, Irwin M.	Ch. E.	1924	*Natick*
Lovejoy, Richard P.	Ch. E.	1922	*Franklin*
Loubris, Gaston E.	E. E.	1923	*Wakefield*
Loud, Emery S.	Ch. E.	1923	*Rockland*
Low, Elmer F.	C. E.	1924	*Portland, Me.*
Lucas, Ernest H.	Ch. E.	1924	*Magnolia*
Lundin, Erik H.	E. E.	1923	*Procter, Vt.*
Luther, Justin J.	M. E.	1924	*Hadlyme, Conn.*
MacDonald, Robert M. T.	M. E.	1924	*W. Roxbury*
McElhinney, Earle S.	M. E.	1924	*Lynn*
McFarland, Dwight F.	Ch. E.	1924	*Solon, Me.*
McKenne, Charles D.	M. E.	1923	*Everett*
McKewen, George D.	Ch. E.	1924	*Eastport, Me.*
McLeod, Edward	C. E.	1924	*Lynn*
McManus, John P.	C. E.	1923	*Roxbury*
McSweeney, William H.	M. E.	1924	*Salem*
Mahoney, John H.	E. E.	1924	*Salem*
Malloy, John W.	M. E.	1924	*Roxbury*
Malnate, William F.	C. E.	1924	*Quincy*
Maloney, Edward F.	Ch. E.	1922	*Dorchester*
Marcus, Jacob	Ch. E.	1921	*Winthrop*
Marcus, Maurice	C. E.	1922	*Dorchester*
Marsh, Charles G.	E. E.	1921	*Newburyport*
Marsh, Rudolph A.	M. E.	1924	*Cambridge*
Marshall, Elmer P.	Ch. E.	1924	*Allston*
Marshall, James P.	E. E.	1923	*Hallowell, Me.*
Martin, B. Malcolm	M. E.	1924	*Swampscott*
Martinelli, Henry C.	M. E.	1924	*Springfield*
Mason, Charles F.	E. E.	1924	*Pownal, Vt.*
May, Charles A.	C. E.	1924	*Fair Haven, Vt.*
Mead, Carl E.	M. E.	1921	*Willimansett*
Meade, William H., Jr.	E. E.	1923	*Peabody*
Messier, Joseph H.	E. E.	1924	*Quincy*
Miller, Wallace C	Ch. E.	1924	*So. Hanover*
Milne, David C.	C. E.	1923	*Hackensack, N. J.*
Moody, Donald C.	M. E.	1923	*Bradford*
Moore, Charles K.	C. E.	1924	*Fall River*
Morgan, Stuart H.	Ch. E.	1922	*Medford*
Morrell, Stanley	E. E.	1923	*Peabody*

NAME	COURSE	YEAR	HOME ADDRESS
Murphy, Charles L.	C. E.	1924	*Worcester*
Nagakura, Kohe	Ch. E.	1924	*Tokio, Japan*
Nason, George L.	M. E.	1923	*Holbrook*
Newman, Irving M.	E. E.	1924	*Boston*
Nicholson, Donald A.	Ch. E.	1924	*Lynn*
Nickerson, Clarence W.	M. E.	1921	*E. Braintree*
Nolan, J. Henry	C. E.	1923	*Jamaica Plain*
Norberg, Ernest M.	C. E.	1922	*Medford*
Nowell, Charles A., Jr.	Ch. E.	1924	*Bellows Falls, Vt.*
Nylin, Carl G.	M. E.	1922	*Worcester*
Nyman, Chester	C. E.	1922	*Marlboro*
Oakman, Roger G.	C. E.	1924	*Neponset*
O'Connell, Harold J.	E. E.	1924	*Boston*
Oliva, John F.	E. E.	1924	*E. Weymouth*
Outlaw, Cornelius H.	E. E.	1924	*Los Angeles, Calif.*
Parad, Emanuel	M. E.	1922	*Boston*
Parker, Alton D.	E. E.	1923	*Quincy*
Parsons, Edward S.	C. E.	1922	*Gloucester*
Parsons, William N.	C. E.	1924	*Gloucester*
Pascoe, Thomas E.	M. E.	1922	*Chocorua, N. H.*
Paulson, Iver E.	Ch. E.	1923	*Woburn*
Paver, William H.	M. E.	1922	*Franklin*
Pearce, Howard T.	C. E.	1922	*Concord Junction*
Pearson, Carl R.	C. E.	1922	*Winthrop*
Peck, Donald L.	E. E.	1923	*Framingham*
Penniman, John	C. E.	1924	*Whitman*
Perley, George T.	E. E.	1924	*Wollaston*
Perry, Alfred L.	M. E.	1924	*Everett*
Perry, Edward J.	M. E.	1923	*Putnam, Conn.*
Perry, Gilbert F.	C. E.	1921	*Putnam, Conn.*
Perry, John A.	Ch. E.	1924	*Reading*
Perry, Norman E.	Ch. E.	1923	*Dedham*
Peterson, Clarence W.	M. E.	1923	*Everett*
Peterson, Vernon R.	M. E.	1921	*No. Abington*
Philbrick, Albert W.	E. E.	1924	*Kittery, Me.*
Phipps, Chester D.	M. E.	1921	*Holliston*
Pierce, Webster W.	M. E.	1924	*Quincy*
Pinkul, Edward J.	C. E.	1924	*Dorchester*
Potter, Wilson	E. E.	1923	*Forestville, Conn.*
Pratt, Carl N.	C. E.	1924	*Winthrop*
Pressey, Wallace E.	M. E.	1924	*Exeter, N. H.*
Prives, Hyman S.	Ch. E.	1921	*East Boston*
Pruscino, Alexander	C. E.	1924	*Boston*
Publicover, Lewis E.	E. E.	1924	*Gloucester*
Putnam, Charles H.	M. E.	1924	*Webster*
Quilty, Ralph G.	Ch. E.	1924	*Dorchester*
Quimby, Hoyt M.	M. E.	1924	*Claremont, N. H.*
Quinn, John F.	E. E.	1923	*Salem*
Quint, Dudley	Ch. E.	1923	*Lynn*
Rabinowitz, Louis	E. E.	1924	*Roxbury*
Radil, Frederick W.	Ch. E.	1924	*New Britain, Conn.*
Rantz, Joseph M.	E. E.	1924	*Beverly*
Ray, William C.	C. E.	1924	*Gloucester*

NAME	COURSE	YEAR	HOME ADDRESS
Read, Alden W.	E. E.	1924	*Bridgewater*
Reed, Linwood L.	M. E.	1923	*Everett*
Reed, Miller G.	E. E.	1924	*Boothbay Harbor, Me.*
Reed, Robert F.	E. E.	1923	*Granville Ferry, N. S.*
Rhoades, Clifford	C. E.	1922	*Bridgewater*
Rich, Luke A.	Ch. E.	1923	*Newton*
Richard, Irenee T.	M. E.	1924	*Salem*
Richards, Walter C.	C. E.	1921	*Weymouth*
Riggio, Samuel A.	C. E.	1924	*Ivoryton, Conn.*
Ritchie, J. Harris	Ch. E.	1924	*Bridgeport, Conn.*
Robbins, Bertrand B.	E. E.	1922	*Elmwood*
Roberts, George I.	E. E.	1924	*E. Weymouth*
Robinson, William J.	Ch. E.	1923	*Pawtucket, R. I.*
Rogers, Allan H.	E. E.	1924	*Jonesport, Me.*
Root, Burritt A.	M. E.	1923	*New Britain, Conn.*
Rosen, Philip	Ch. E.	1922	*Boston*
Rosenblatt, Irving	C. E.	1922	*Saxonville*
Rubin, Benjamin	C. E.	1923	*Roxbury*
Rundlett, John C.	C. E.	1924	*Newburyport*
Russell, Charles C.	E. E.	1923	*Exeter, N. H.*
Russell, John B.	C. E.	1924	*Quincy*
Sampson, Edward N.	E. E.	1922	*Sharon*
Santis, Julius G.	Ch. E.	1921	*Boston*
Savignac, Alphonse L.	C. E.	1923	*Amesbury*
Sawtell, Raymond I.	E. E.	1924	*Shrewsbury*
Schaller, Irving R.	E. E.	1924	*Salem*
Schwartz, Joseph P.	C. E.	1923	*Revere*
Schweda, Carl R.	E. E.	1924	*Cambridge*
Secord, Harold	E. E.	1923	*Newton*
Semenyna, Waldimir	C. E.	1924	*Boston*
Shailer, Fisk	Ch. E.	1924	*Chester, Conn.*
Shaw, J. Arnold	Ch. E.	1924	*Danvers*
Shaw, Richard C.	M. E.	1923	*E. Bridgewater*
Shea, Leon H.	E. E.	1924	*Rumford, Me.*
Shepardson, Lee W.	E. E.	1924	*Baldwinville*
Shopneck, Henry P.	Ch. E.	1922	*Boston*
Shumavonian, Sorun P.	C. E.	1924	*Dorchester*
Shumway, Herbert L.	M. E.	1923	*Mattapan*
Silverman, Morris	M. E.	1924	*Quincy*
Simmons, Murray J.	C. E.	1924	*Dorchester*
Smith, Benjamin L.	E. E.	1923	*Concord*
Smith, Farnham W.	Ch. E.	1923	*Concord*
Snyder, Harold B.	E. E.	1924	*Exeter, N. H.*
Somes, John J.	M. E.	1924	*Gloucester*
Souther, George H.	M. E.	1924	*Winthrop*
Southworth, Burton	E. E.	1924	*W. Stoughton*
Spear, Roger E.	C. E.	1921	*Boston*
Spector, Benjamin	C. E.	1924	*Stoughton*
Sperl, Warren	Ch. E.	1922	*Auburndale*
Squier, Roger W.	C. E.	1924	*Boston*
Standley, David	C. E.	1921	*Beverly*
Stanton, Fred J., Jr.	E. E.	1924	*Wenham*
Staples, Arthur C.	E. E.	1924	*Dighton*

NAME	COURSE	YEAR	HOME ADDRESS
Staples, Merton T.	C. E.	1921	*Danvers*
Staples, Paul E.	M. E.	1924	*Arlington Heights*
Stearns, Elton O.	C. E.	1924	*Waltham*
Stevens, Thomas A.	E. E.	1923	*Deep River, Conn.*
Stewart, Daniel	M. E.	1924	*Sydney, Nova Scotia*
Stewart, Oscar E.	Ch. E.	1923	*Saco, Me.*
Stillman, Joseph	E. E.	1924	*Newburyport*
Stimson, Glen H.	M. E.	1924	*Athol*
Stoddard, Hatherley	M. E.	1923	*Salem*
Stotz, Herman C.	C. E.	1924	*Brighton*
Strong, John S.	Ch. E.	1924	*Winthrop*
Sullivan, John J.	E. E.	1921	*Holyoke*
Sullivan, William H.	M. E.	1922	*Salem*
Swanson, Gustaf	Ch. E.	1923	*Proctor, Vt.*
Swanson, Wallace C.	M. E.	1924	*Lynn*
Sweetland, William F., Jr.	E. E.	1924	*Providence, R. I.*
Swett, Lewis A. W.	M. E.	1924	*Winthrop*
Symonds, Allen M.	Ch. E.	1924	*Waban*
Tarplin, Emanuel	Ch. E.	1923	*Lynn*
Taylor, A. Pirrie	M. E.	1924	*Dorchester*
Taylor, Norman C.	C. E.	1924	*Wellesley*
Taylor, Robert N.	Ch. E.	1924	*Watertown*
Tenney, Howard H.	E. E.	1924	*Newport, N. H.*
Thatcher, John G.	C. E.	1924	*Brookline*
Thompson, Alan M.	C. E.	1923	*Roslindale*
Thompson, Harold C.	C. E.	1923	*Bridgewater*
Thompson, Herbert L.	Ch. E.	1923	*Norwood*
Thompson-Evans, Owen G.	M. E.	1924	*Waltham*
Thomson, Claude W. R.	M. E.	1924	*Holyoke*
Titcomb, Oliver S.	M. E.	1924	*Somerville*
Toole, Cameron S.	C. E.	1922	*Clinton*
Traister, Louis	E. E.	1924	*Newburyport*
Tulloch, Douglas F.	E. E.	1924	*Bridgewater*
Turner, Burton G.	C. E.	1922	*Eastport, Me.*
Ulmer, Donald J.	E. E.	1924	*Norton*
Vandenkerckhoven, William	E. E.	1924	*Bethel, Me.*
Vigdor, Irving A.	E. E.	1924	*Boston*
Vincent, George D.	C. E.	1923	*Watertown*
Vines, Frederick D. L.	E. E.	1924	*Greenbush*
Wade, Edward A.	E. E.	1924	*Jamaica Plain*
Waite, Willis H.	E. E.	1924	*Shoreham, Vt.*
Waldron, F. Elliott	E. E.	1924	*Gloucester*
Walker, Arthur E.	M. E.	1924	*Franklin*
Walker, Lawrence D.	Ch. E.	1924	*Watertown*
Wallace, Albion K.	E. E.	1924	*Millbridge, Me.*
Wallin, Francis T.	M. E.	1924	*Allston*
Warner, David G.	M. E.	1924	*Sterling*
Warner, W. Darrington	E. E.	1924	*Newburyport*
Weeks, Byron	M. E.	1924	*Tisbury*
Wentworth, Clarence	M. E.	1922	*Revere*
Werth, Lloyd L.	M. E.	1921	*Rochester, N. Y.*
West, Harold E.	E. E.	1924	*Chester*
Westland, Walter N.	C. E.	1924	*Somerville*

Weston, Philip O.	E. E.	1924	*Mattapan*
Wetmore, George H.	E. E.	1924	*Peabody*
Wheeler, Clifford	Ch. E.	1922	*Malden*
Wheeler, Harold W.	Ch. E.	1924	*Winthrop*
White, George W.	C. E.	1924	*E. Woodstock, Conn.*
Whiton, Wilson	M. E.	1923	*Hingham*
Wilbur, Fowler W.	E. E.	1924	*Springfield*
Wilcox, Arthur L.	C. E.	1924	*Maynard*
Wilkins, Henry M.	C. E.	1921	*Marblehead*
Willey, Laurence V.	C. E.	1924	*Skowhegan, Me.*
Williams, Charles I.	M. E.	1922	*Quincy*
Williams, Edwin C.	C. E.	1922	*Natick*
Willis, Howard A.	Ch. E.	1923	*Melrose Highlands*
Wilson, Karl E.	E. E.	1924	*No. Wilmington*
Wineblatt, Michael	E. E.	1924	*Salem*
Wood, Arthur S.	C. E.	1924	*Portland, Me.*
Wood, Manson E.	M. E.	1923	*Wakefield*
Wright, John L.	E. E.	1924	*No. Attleboro*
Wright, Maurice H.	Ch. E.	1924	*Springfield*
Wright, Moses E., Jr.	E. E.	1922	*Newburyport*
Young, Claude	M. E.	1924	*Quincy*
Young, Horace B.	M. E.	1923	*Atlantic*
Young, Nelson B.	M. E.	1922	*Reading*
Young, Walter H.	E. E.	1924	*Matinicus, Me.*
Young, Wilfred A.	E. E.	1923	*Baltic, Conn.*
Zak, Alexander M.	C. E.	1924	*Boston*
Ziegra, Albert G.	Ch. E.	1924	*Deep River, Conn.*

INDEX

Absences 42
Acceptance of Students..... 34
Admission 31
Advisors 41, 43
Advanced Standing 40
Algebra 31, 33, 60
Application for Admission..... 23, 32
Application Blank 103
Athletics 22, 45, 95
Attendance 37
Board of Governors..... 7
Books and Supplies..... 40
Breakage Deposits 38
Calendar 2, 3
Candidates for degrees..... 41, 42, 58
Certificates, Entrance 31, 33
Chemical Engineering 56, 88
Chemical Laboratory 21, 88
Chemistry 88
Civil Engineering 50, 68
Civil Engineering Equipment..... 18
Clubs 45, 46
Condition Examinations 41, 42
Conduct 43
Co-operating Firms 24, 27
Council, Executive 8
Courses of Study 13, 40, 49
Cultural Subjects 66
Degrees 13, 37, 47
Deposits for Breakage 38
Discipline 44
Dormitories 36
Drawing 19, 64
Earnings 25
Economics 66
Educational Certificates 33
Elective Subjects 46
Electrical Engineering 54, 80
Electrical Engineering Laboratory 20, 81
Electrical Measurements Laboratory 19, 86
Electricity 80
Employment 23
Engineering Conference 93
Engineering Equipment 18
Engineering Laboratories 18
Engineering Practice 23, 47
Engineering Societies 47
English 59
Enrollment 13, 98
Entrance Examinations 33, 34
Entrance Requirements 31
Equipment of the School..... 18
Examinations 33, 41
Executive Council 8
Expenses 36, 40
Faculty 9
Fees 32, 37, 38, 41, 48
Firms 24, 27
Founding of School 13
Four Year Courses 37
Fraternities 46
General Subjects 66
Geometry 31, 33, 60
Governors, Board of 7
Grades 42
Graduates 48
Graduation 47
Gymnasium 22
Heat Engineering 77
High Schools 15
History of the School 13
Holidays 3
Hours of School 24, 37
Hydraulics 70
Instruction, Subjects of..... 58, 96
Instructoring Staff 9

Laboratories 18
Laboratory Fees 38
Lecturers, Special 12
Libraries 18, 22
Location of School 34
Machine Design 75
Map, Guide 35
Marks 42
Mass Meetings 43
Materials 73
Mathematics 31, 33, 60
Mechanical Engineering 52, 74
Mechanical Laboratory 18
Mechanics 74
Musical Clubs 45
Northeastern Tech 45
Object of School 13
Officers of College 8
Operation of School 14
Pay of Students 25
Payments 32, 39
Periods 2
Physical Training 22, 45, 95
Physics 62
Physics Laboratories 21, 61
Plan of Operation 14
Positions 23, 48
Practical Work 23
Preparatory Schools 34
Probation 41
Professors 9
Professional Societies 47
Provisional Acceptance 34
Publications 45
Purpose of School 13
Railroads 69
Refunds 39
Register of Students 98
Relation of School to High Schools 15
Reports of Standing in Studies 40, 43
Residence 36
Requirements for Admission 31
Requirements for Graduation 47
Rooms 19, 36
Rules for Standing in Scholarship 42
Scholarship 40, 42, 45
Scholarship Committee 40, 41, 43
School Year 36
Social Activities 45
Societies 47
Special Lecturers 12
Special Students 31, 40
Sports 45, 95
Standing of Students 40
Structures 71
Student Activities 41, 45
Student Activities Fee 32, 38, 46
Student Advisors 41, 43, 44
Students, Register of 98
Students, Transferring from other Colleges 40
Subjects of Instruction 14, 58, 96
Subjects for Examination 33
Summer Preparatory School 34
Supplies 40
Surveying 69
Synopsis of Courses 59
Terms 3, 36
Thesis 47, 94
Trustees 7
Tuition 32. 37
Vacations 2, 23
Wages 25
Work, Practical 23, 24
Work, Schedules 26
Year, School 36, 49
Year Book 46
Y.M.C.A. Membership 32, 38

NORTHEASTERN COLLEGE
SCHOOL OF ENGINEERING

Boston, Mass., ... 192

To the Dean:

Name in full .....

hereby respectfully applies for admission to the ..... *Engineering Course of the School of Engineering for the school year* 19 19 , *and submits the following data:*

Residence ..... *Street*

Town .....

State ..... *Tel* .....

Date of Birth ..... *Age* .....

Parent (father's) Name .....

" " *Address* .....

Graduate of ..... *High School. Year* .....

Location of High School .....

If not a graduate, how many years were you in High School?

When did you leave? .....

Why did you leave? .....

Name of Principal .....

If employed since graduation, what is the name of your employer? .....

Employer's address .....

Names and addresses of two other persons, not clergymen, to whom we may direct inquiries concerning you. (Give former employers' if possible.)

.....

.....

.....

If admitted to the school do you plan to complete the full four years' course and qualify for the degree? .....

Do you wish the School to place you at Engineering Practice?

When do you wish to start Engineering Practice?.....

Have you a position which you wish to retain in co-operation with the School?.....

Where will you live during the school-year?.....

Weight .....*Height* .....

Have you any physical infirmities?.....

Is your general health good, fair, or poor?.....

Additional Remarks:

NORTHEASTERN COLLEGE
AND AFFILIATED SCHOOLS

DAY SCHOOL

School of Engineering

Four-year courses in Civil, Mechanical, Electrical, and Chemical Engineering, leading to the degrees of Bachelor of Civil, Mechanical, Electrical, and Chemical Engineering: B. C. E., B. M. E., etc. The school is operated in co-operation with engineering firms. Students earn while learning. Open to high school graduates.

EVENING SCHOOLS

School of Law

Four-year course leading to the degree of Bachelor of Laws. Complete preparation for the Bar examinations and the practice of law. Case method of instruction. Day school standards of scholarship. Courses organized for business men who desire a legal training. Open to high school graduates or men with an equivalent education. A limited number of men of maturity and experience admitted each year as special students, not candidates for the L. L. B. degree.

School of Commerce and Finance

Four-year courses including Accounting, Auditing, and Business Administration, leading to degrees of Bachelor of Commercial Science and Master of Commercial Science.

Complete preparation for state examinations for Certified Public Accountants and for business executives.

AFFILIATED SCHOOLS

Northeastern Evening Polytechnic School

A school offering three-year college courses in Civil, Mechanical, Electrical, Chemical, and Structural Engineering leading to a diploma. The school trains men for positions of trust and responsibility.

Northeastern Preparatory School

Courses of High School grade in English, Ancient and Modern Languages, Mathematics, History, Economics, Government, Chemistry, Physics, Penmanship, Bookkeeping, Shorthand, and Mechanical Drawing. Instructors from High Schools in Boston and suburbs. The school offers facilities for a four-year course in the evening, and is in session for three terms of sixteen weeks each year. It is possible for students to meet college entrance requirements in from three to five years of evening work.

For further information concerning any of the above schools, address

NORTHEASTERN COLLEGE

316 Huntington Avenue, Boston 17, Massachusetts

UNIVERSITY OF ILLINOIS-URBANA
3 0112 112231730

SCHOOL OF ENGINEERING

FOUNDED FOR THE INSTRUCTION OF MEN IN THE THEORY AND PRACTICE OF ENGINEERING

WALKER LITH. & PUB CO
BOSTON